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A Clinical Address

ON

DRUG ADDICTION*

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ADDICTION to drugs in recent times has assumed such world-wide dimensions that it is regarded by all nations with serious misgiving, and by some as a menace to their civilization; many of the problems connected with it still require much investigation and particularly the conditions which have led to its prevalence. In the consideration of the problem in the past, attention has been concentrated on the drugs causing addiction, but much new evidence suggests that the problem is really determined by the prevalence of a new type of person arising with, and probably out of, the development of modern civilization, and not by the drugs which merely satiate and relieve him.

In primitive man the weakest and most foolish were exterminated, while the strongest and most alert, that is, those most fit to exist under the conditions of life, as it was then, survived. The attempt to evade this natural law comprises the history of civilization. Civilization, or the living together as a society, aims at limiting the struggle for existence by substituting mutual peace for continual strife; at removing man from his place in the animal kingdom and thus escaping from natural selection; at promoting the common weal by moral as opposed to natural evolution. In the best civilizations everyone possesses the means of existence, the struggle for existence plays no part in life, and natural evolution has ceased to exist. But there is a limit to this, for if man obeys the command to increase and multiply then the struggle for existence must inevitably occur sooner or later, and, with it, destruction of civilization by the reproduction within itself; it means not only that the human stock ceases to improve, but, since it provides for the subsistence and physical protection of the unfit, it may mean that it retrogrades.

Civilization is dependent on education, the primal object of which is the suppression of natural inclination, a precept which can be acquired only slowly, since everyone possesses the desire for self-gratification to an unlimited extent. This principle, the practice of self-control and renunciation constitutes indeed the very basis of civilization, though it does not, in itself, make for happiness. The struggle for existence in primitive man is replaced by a struggle for precedence in the social life, and that man who sees a little further than his neighbours gains position, riches, or fame, but success in such mental battles carries with it no precedence in reproduction.

In very recent times life has changed in other ways. The advance of science has limited the need for manual labour, and made the natural outdoor physical life of man rarer and the indoor mental life commoner. These changes in natural life constitute some of the causes which lead to neurosis, but there is yet another to which attention has not been properly directed. I refer to the universal and regular consumption of caffeine. I suppose we might call it the commonest, as it may be the least harmful, of all addictions, but, as it bears directly on our subject, it must receive brief consideration.

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THE CAFFEINE BEVERAGES

Tea was not imported into Europe till 1606, when the Dutch imported a quantity, and its general employment was not adopted without bitter opposition. In 1673 an attempt was made in Parliament to forbid its use. In 1757 Jonas Hanway, the introducer of the umbrella into England, wrote his celebrated essay on tea, in which he asks: "How many thousands in this country are annually poisoned by tea, gin and wine?" and, later, he states that the physicians of his time very seriously declare "that they are more obliged to tea for the gains arising from their practice than to all other debaucheries." The extent of the use of tea, coffee, and cocoa in different countries is uncertain, but in 1916 for coffee alone Holland consumed 22 lb. per head annually, Belgium 15, the United States 10, Germany 7, and France 5. The largest consumers of tea are Great Britain, the United States, China, and India, and if we include tea and coffee together the largest consumers are probably the English-speaking races.

It behoves us then to examine with some care what effect this continuous imbibition of caffeine may have on the race. The dose of caffeine taken daily is not inconsiderable when it is remembered that a good cup of tea usually contains more than a grain. The average man must take from 5 to 8 grains daily, and the tea-lover very much more. Moreover, unlike many other drugs, tolerance to caffeine is not very great, so that the drug exerts nearly its full action.

The continual use of caffeine produces a condition of mental irritability and excitability; the user complains of attacks of dizziness and digestive troubles; sometimes tremors are pronounced, and always reflexes are exaggerated. All these effects may be produced by even moderate quantities of caffeine, such as 6 or 7 grains daily, though different people vary much in susceptibility.

Caffeine has been called an "intellectual" beverage, because it is supposed to facilitate thought and association, and this is said to explain the fact that many of those engaged in mental occupation can only work under its influence. Modern investigations show, however, that caffeine has not quite the effect we have been taught to believe. If the action of morphine were determined only on the morphinomaniac, an entirely different conception of its effects would be obtained from that which we now know it possesses. But knowledge of the action of caffeine on the mind of man has been obtained mainly by experiments on those who were already caffeine "addicts," and naturally enough on these people caffeine would be wholly beneficial. Caffeine diminishes reaction time and discrimination time in those who have the caffeine habit; furthermore, those with a caffeine habit and some tolerance, on discontinuing tea and coffee, show a shortening of both their reaction and discrimination times.

Caffeine, as tea and coffee in the amounts in which we nearly all take them, alters nerve responses. Irritability, restlessness, palpitation, tremors, and dyspepsia may be produced by tea and coffee, but they are also well recognized features in the neurotic. There is certainly something to be said for Dr. Charles Fernet's definition of the caffeine drinks as "satellites of alcohol," since alcohol removes irritability and restlessness, and in this respect is an antidote to caffeine, just as after-dinner coffee is taken partly to counteract the effects of alcohol. However this may be, there can be little doubt that the inordinate use of caffeine over many years predisposes to mental irritability and instability which are features of the neurotic person. Another peculiar effect of tea is that occasionally it produces an extreme degree of physical depression. An hour or two after a breakfast including coffee or tea, when the energies of the body should be at their optimum, the sufferer is seized with a grievous sinking referred to the stomach; or it may be that he complains of pain and palpitation, and not infrequently confusion and giddiness add to his troubles. Many people spoil the best years of their lives in this way until they consult a physician who recognizes the cause and so sets them free.

ALCOHOL

Alcoholic beverages have been known from the beginnings of civilization. Beer has been the national beverage of the Anglo-Saxon for a thousand years and more. As addiction to alcohol certainly exists, it is right that a short reference should be made to its action.

Alcohol differs from narcotics in general in that it is widely distributed throughout nature, though always in association with living cells. Plants produce and use it; it can be detected in various parts of flowering plants, the growing tissues, seeds and trunks of trees, while in more lowly organisms its production by the yeasts

from sugar, its food-value to the vinegar-forming organisms are sufficiently familiar examples. Alcohol has been found also in the tissues of higher animals, though in small quantities: in large amounts it could not exist, since one of the biological characteristics of alcohol is its ready oxidation. The various varieties of *Bacillus coli communis* an organism living normally in the alimentary canal, under suitable conditions form from 9 to 17 per cent of alcohol, and as it is one of the most easily absorbed substances known, it is impossible to avoid the conclusion that it is absorbed into the system.

Under the influence of alcohol, mental operations are shortened, simple reaction times are quickened, mental associations, such as making words to rhyme, are facilitated, reading in whispers is rendered easier, and the appreciation of small differences in weights is enhanced. These stimulation effects are due to a depression of the brain beginning at the highest centres, that is, those which are developed last. It soothes or depresses the activity of the higher faculties of mind, and liberates the real person from the bondage of all those restraints which social customs and conventions demand; it frees the more primitive instincts and emotions, though for all precise mental operations the use of alcohol is detrimental.

Alcohol is therefore an artificial means of relaxation and under its influence the burdens, anxieties, and worries of modern indoor mental life may be forgotten. All the picturesque writings of the sociability produced by the flowing bowl are dependent on the diminished irritability of supersensitive nervous systems. Normal play, sport, and hard physical exercise also relieve the higher brain centres by inducing a return to more primitive behaviours. The desire for alcohol and tobacco should be regarded, at least partially, as a natural craving of those who take little physical exercise to attain artificial relaxation.

Alcohol relieves fatigue and depression in that certain higher faculties of mind, such as attention and memory, are improved. Take the example of a mental worker returning home to dinner after a strenuous day, irritable, anxious, and worried. The automatic contractions of the stomach, by which the sensation of hunger is determined, are entirely inhibited by his mental state and therefore appetite is lost; a glass of some alcoholic beverage under these conditions removes the worry and anxiety, and appetite and digestion return.

The word alcoholism has now come into common use, generally without regard to its meaning and significance; the term should be strictly analogous to the terms morphinism and cocainism. Alcoholism is not drunkenness, nor even the habit of drinking occasionally to excess; any normal person may at times become intoxicated, but none of these exhibit the symptoms referred to as alcoholism. The normal man after taking somewhat immoderately of alcohol becomes in certain respects abnormal; the alcoholic, on the other hand, takes alcohol because he needs it to become "normal." He is a neurotic; he exaggerates all the common incidents of life; he is out of harmony with the rest of the world; often to him nothing seems worth while; life is a burden, and effort intolerable. Alcohol relieves the condition; depression and inertia temporarily disappear, and life for the time being is looked upon through the spectacles of the ordinary healthy man. It is not suggested that every person in a state of mental fatigue who is relieved by alcohol is therefore an alcoholic, though it is possible that with a little practice he might become one. The alcoholic is precisely the same type of person who, if opportunity affords, takes to drugs; temporarily they give him the relief that alcohol gives, but after having once transferred his allegiance to the needle he practically never returns to alcohol. De Quincey knew this when he wrote: "I do not readily believe that any man having once tasted the divine luxuries of opium will afterwards descend to the gross and mortal enjoyments of alcohol."

TOBACCO

Evidence is also forthcoming to suggest that the enormous increase in the tobacco habit in the last thirty years is not unassociated with the stress of modern life. Habitual smokers are agreed that the weed acts as a mild sedative to the central nervous system. The type of action is of a somewhat remarkable character, and may offer an explanation of the widespread use of tobacco. Physical fitness or well-being is determined by our feelings, which are the result of sensations. If response to sensation varies from the normal, whether by exaggeration or diminution, rest induces a return towards normal. Experimental observations suggest that by smoking a similar type of effect is produced, though even more decided, and hence the sedative effect of tobacco in conditions of irritability, and the stimulating effect in those of weariness and de-

pression. Tobacco, then, may be helpful to all those whose sensory threshold is abnormal.

THE NEUROTIC

Increased nervous sensibility appears to be a product of civilization and wealth, of indoor life, luxury, a lack of physical exercise, and perhaps excessive indulgence in the satisfaction of desires, and of inordinate drinking of tea. Such people are not phlegmatic, stupid, and uninteresting, but are rather those possessed of quick perception, acute sensibility, and other higher attributes of mind which constitute what is termed culture. These neurotics are highly reflex people who are so responsive to external impressions that the associations set loose by any ordinary stimulus causes such a complexity of cerebration that the common affairs of life become a burden. But such complexity of cerebration cannot continue long. Soon it gives place to fatigue, depression, and mental distress, and life becomes burdensome, anxious, and sometimes not worth while. The "instinct of self-preservation" is something more than a clinging to bare life; it contains a desire for the fulness of it; a man will lay down his life for a chimera without a murmur, but if it is to be lived he would live it well. Those who possess a mental complexity of this type discover, if the chance occurs, that they are relieved from their troubles by narcotic drugs; their conflicting impulses and vivid sensations are calmed, and the everyday trifles and inconveniences of life are no longer exaggerated out of all proportion to their significance; life, instead of being oppressive and anxious, becomes pleasant and free fro m worry.

All this means that the drug habit is not a disease but rather a sign of a pre-existing mental condition. Were it a disease, an accidental condition added to a normal person, then it should be readily curable, especially in the earlier stages. But everyone is agreed that this is not the case, though it is recognized that those who contract the habit as a result of disease, as, for example, by the use of opiates after a surgical operation, that is, the relatively more normal people, are the easiest to cure.

The happiest of men has moods in which he wishes he were again an irresponsible child, but the neurotic under morphine is reduced to the light and careless livery of the child. He becomes happy, and in the earlier stages of the indulgence almost normal, but gradually, as it becomes necessary to increase the allowance of narcotic, he passes into that bemused sense of brilliant ascendency which is also characteristic of the earlier phases of the sufferer from general paralysis of the insane. The chief characteristics are now plausibility and disorderliness; the addict has a complete disregard for time and becomes querulous, exacting, slanderous, and soon ceases to comply with the rules of ethical conduct. Some men take small doses of opium or morphine regularly all their lives without any apparent ill-effect. I have, for example, known business men who were unable to attend to an important matter until they had received a small injection of morphine. But the neurotic type of patient is never satisfied, and, if left to himself, must be always increasing his allowance, until he becomes a complete mental and moral degenerate.

Besides the neurotic group of addicts there are others with whom fortunately it is easier to deal. Those smitten with incurable and painful disease may require large and sometimes increasing doses; for these, few, if any, would begrudge the relief that opium gives. A few people are led to the use of the needle by pain which is wearisome rather than acute, and there are others who take to morphine to relieve their weariness or headache, mainly because it lies to their hand; this group is composed principally of doctors and chemists.

WITHDRAWAL

Addicts are held in subjection largely by fear. Prolonged indulgence often fails to afford pleasurable sensations; still these people must continue with their habit in order to avert the crisis of withdrawal. Their horror of pain, both mental and physical, is an obsession, and contact with the realities and responsibilities of the world they are unable to meet.

The symptoms of withdrawal correspond almost exactly with stimulation of those tissues which morphine in medicinal doses depresses. The yawning, sneezing, nausea, vomiting, and mucous secretion result from stimulation of the medulla; the abdominal pains and diarrhœa from stimulation of Auerbach's plexus; the twitchings, cramps, circulatory troubles (rapid pulse, arrhythmia) and sometimes even convulsions and collapse, are due to excessive stimulation of the cortical cells. An early effect of withdrawal is a rise in blood pressure from excessive activity of the medulla; this is followed later, at all events in severe cases, by a marked fall in the pressure associated with collapse. A patien$_t$

with these symptoms, even when in a state of collapse, is completely resuscitated by an injection of morphine; in a few minutes he changes from a state of utter collapse to a relatively normal person. Sudden cessation of alcoholic beverages in those who have imbibed too freely for a long time may also lead to withdrawal symptoms, which we term delirium tremens. The explanation I suggest for these withdrawal symptoms is that nerve cells, after prolonged narcosis, on re-awakening become hyperexcitable; not only does this explanation account for all the facts, but there is much direct evidence in support of it.

Degree of addiction may be gauged by the severity of the withdrawal symptoms; these are by far the most severe with heroin, less with morphine, and least with cocaine.

HEROIN

Heroin has been used as a substitute for morphine and as an addiction drug since about 1913; at this time its properties were hardly recognized and it could be easily obtained. The addict prefers heroin to morphine, it intoxicates more deeply and it does not constipate. The average morphine addict has, perhaps, one or two stools weekly, whereas the bowels of the heroin addict act almost normally.

About 1913 heroin was employed in the United States and, to a smaller extent, in Europe as an addiction drug and a substitute for morphine. Sometimes it was taken by injection and sometimes as snuff, like cocaine. The public had little difficulty in obtaining the supplies they required of this proprietary substance, and it was very much vaunted as a cure for morphinism. Pouchet was the first man to warn the profession against the use of heroin, and Rodet pointed out that the heroin habit is more easily contracted and less readily cured than the morphine habit, on account of the respiratory syncope which is apt to occur when the drug is stopped.

When the dose is first diminished in the addict under treatment, intellectual torpor ensues, the circulation and respiration are slowed, and fits of suffocation may supervene. Patients who have undergone a cure for the morphine habit have a comparatively short convalescence, lasting, perhaps, six or eight weeks, but the subjects of heroin poisoning have a long and more painful period of convalescence, and they do not regain their normal weight or begin to have undisturbed nights till four or five months after stopping the drug. The heroin habit is the worst of all the drug vices known to man and by far the most difficult to cure, although it is possible that some of the newer alkaloids, to which reference will be made later, may equal it.

COCAINE

Cocaine requires a few words to itself because it acts differently from the narcotic alkaloids.

Coca leaves have been used from time immemorial by the Indians in the West of South America as a stimulant and narcotic. The Indians take coca leaf in the same way that Europeans take tea or coffee, as a stimulant for mental and physical fatigue. Natives who chew the leaf are reputed to be able to perform long and tedious journeys with less fatigue and without feeling the pangs of hunger and thirst. The wonderful endurance of guides and mail carriers travelling through the passes of the Cordilleras where a mule cannot go has been a frequent topic of historians.

Mantegazza stimulated interest in coca in Europe about 1850. He stated that after drinking about 4 drachms of an infusion of leaves he experienced a feeling as though isolated from the external world, with an irresistible inclination to exertion, which was performed with great ease. After taking 18 drachms of the leaves in one day he experienced the most intense mental exhilaration, an unthinkable beatitude, in which he said: "I prefer a life of ten years with coca to a life of a million centuries without coca." Attempts by Europeans in the Alps and elsewhere to simulate these effects have not been successful.

Cocaine as a drug of addiction came into notice in the early nineties, but the habit of sniffing became in no sense a menace till about 1910. In the early days of the war cocaine users became plentiful in Paris; the alkaloid could be purchased from the habitués of the cafés and music-halls, and the cult of sniffing came into existence, and quickly spread to London. The cocaine was used in these instances, at all events at first, as a rapid and exhilarating intoxicant, a substance to produce complete abandon and an utter disregard for consequences and the future; more occasionally it was taken in some form of alcoholic beverage.

The habit, when once acquired, is, in some respects, the worst of all drug habits, because it leads to mental, moral, and physical degeneration more rapidly than with the narcotic drugs of addiction. The morphinist retains some desire to defeat his enslaver; the cocainist cares nothing

for freedom; the mind is completely bemused. Unlike morphine, cocaine induces insomnia, loss of appetite, and dyspepsia, yet, in spite of the fact that it leads to degeneration so rapidly in uncomplicated cases, the prognosis is better than with the morphinist and much better than with the heroinist, because the drug can be withdrawn at once without injury to the addict. Cocaine addicts, who are so far degenerated that the alkaloid no longer affords satisfaction or relieves them, turn, either to another drug, or allow themselves to be "cured," often with the idea that they may have the delight of returning again to cocaine.

In pre-war days a good deal of the addiction has been traced to prescriptions given for the relief of pain or the treatment of disease, such as the use of a cocaine spray for hay fever or asthma; some no doubt contracted the habit through low associations, bravado, or to obtain a delirious intoxication. The majority of cocaine addicts are of the neurotic type and become victims during adolescence, sometimes even before mental development is complete. Here also the problem is to determine the underlying cause of the mental condition which has led the person to resort to drugs. Since the war it is safe to say that addiction to cocaine never follows the physician's prescription.

Addicts become tolerant to cocaine as they do to morphine; with a little practice, in a month or two, the dose may be easily increased from 1 grain up to as much as 20 grains.

New Drugs of Addiction

Opium contains besides morphine two other alkaloids closely related to it; codeine present from 0.3 to 4 per cent and thebaine from 0.1 to 0.5 per cent. Codeine is not a drug of addiction; thebaine causes convulsions like strychnine; and until recently was discarded as useless. But thebaine is readily oxidized into substances termed codeinone and oxycodeinone; these substances on reduction acquire new properties similar to those of morphine by the formation of a substance, dihydroxycodeinone, generally known as "eucodal." Eucodal resembles in its action heroine rather than morphine. When this substance came under the opium convention about two years ago its narcotic action became more generally known; its use greatly extended, and in consequence the price of thebaine rapidly rose. Just as heroin when first prepared was advocated as a cure for opium smoking, and shipped in large quantities to the East, especially China, so eucodal has been advocated as a cure for the opium habit, and is used in parts of the East as an anti-opium remedy.

Codeinone can be prepared either from thebaine or from codeine. It differs from the latter in that the alcoholic hydroxyl group is transformed into a ketone group; it is easily converted into dihydrocodeinone or "dicodide," which is more readily prepared from codeine than thebaine. Now codeine, as I have said, is not a drug of addiction, but any chemist can easily convert codeine to dicodide, which, although introduced as a "super-codeine," is a drug of addiction as satisfactory to the user as heroin.

The number of ethers and other derivatives which can be prepared from morphine, codeine, and thebaine is almost unlimited, and as the large number which have already been prepared all show the morphine type of action, it is obvious that all these derivatives should come under the jurisdiction of the League. The proof of the harmlessness of a new derivative should rest with the manufacturer.

The Time For Cure

Few addicts come willingly for treatment so long as a supply of drug is available and it continues to produce pleasurable effects. When they submit themselves, one of the first principles of treatment is to remove the patient from all those conditions and associations which there is reason to believe have led to the trouble.

In moderate addiction to morphine, before the person is completely enslaved, or when he has been content to limit himself to a daily dose of narcotic which he does not increase, it is found that there is little wrong with physical fitness or impairment of bodily function, which suggests that in this group a cure may be expected. It has frequently been noted that when such addicts have passed the crisis of withdrawal, they remain without craving for long periods when their surroundings are changed, but relapse on returning to their former surroundings. So soon therefore as the patient has returned to normal health, all association with his former conditions should, as far as practicable, be removed. Association memories no doubt form the dominant factor here. The object of treatment is to replace these by substituting a desire which will become more dominant.

The members of the more serious group of addicts, however, are rarely cured by any such treatment. The addicts in this group have some pre-existing mental condition, a supersensitiveness to afferent stimuli, and narcotics are the method they have employed to relieve themselves. Addiction here, then, is not entirely an association habit, but is something inherent, a mental characteristic, and it is open to doubt how far it is possible to influence character. As experience teaches that thieves and blackmailers revert to their former life so soon as their incarceration is over, why not the intellectuals?

Many examples might be given to prove this contention. It is common knowledge that most, perhaps 90 per cent, of the addicts taken into mental hospitals and discharged "cured" relapse within a year. More interesting are the figures given for the United States Penitentiary in Atlanta. The warden of the prison states his opinion that 90 per cent of the addicts confined in a penal settlement for one year or less relapse after discharge, but that only 17 per cent relapse if they are incarcerated for three to five years. This gives a definite idea of the time of control necessary to effect a cure.

THE WORLD'S NEEDS OF NARCOTICS

The manufacture of narcotic alkaloids from opium, and of cocaine from coca leaves, is conducted in Germany, Switzerland, Holland, England, Japan and Russia; the rest of the world is supplied from these countries. The U. S. A. estimates consumption by the formula: Consumption equals production minus export, importation not being allowed. Many methods have been suggested to limit the production of these alkaloids to the legitimate medical needs. Thus it has been proposed that the cultivation of the poppy should be limited, and Great Britain did, in fact, diminish the land under cultivation in India, but the only effect was to stimulate the cultivation in Persia and to diminish trade in India. In 1924 Great Britain suggested yet another plan, that the manufacture of the alkaloids should be controlled and limited, and the Advisory Committee of the League of Nations on Traffic in Dangerous Drugs has recently proposed a similar plan. It suggests that the manufacture of narcotics shall be limited and controlled and that each country shall estimate its needs and be catered for accordingly. By the Geneva agreement of 1925, approved by about fifty different countries, it was determined that permission to import narcotics should be made by restricted certificates given to the importer and that exportation should only be authorized when the appropriate certificate from the importing country was presented. This certificate system should be the means of restricting or preventing illicit exportation from manufacturing countries.

The consumption of narcotics for any country may be calculated by adding the imports to the production in that country and subtracting the exports; these figures are available for about forty governments, representing 600 million consumers of medicinal opium, and these roughly represent one-third of the population of the world. There are other countries in which the approximate consumption is also known; and it will not be an exaggeration to assert that the legitimate medicinal amount of opium required for approximately 50 per cent of the world's population is available. The requirements for the rest of the world can be determined only indirectly and by comparisons. By careful calculations it is estimated that 56 tons of opium is sufficient to supply the legitimate requirements of the whole world.

Similar calculations show that 7 tons of opium will supply the world's needs for heroin, about 10½ tons the needs for morphine, and 10 tons for codeine. Supposing the population of the world to equal 2,000 millions, then about 77 tons of opium should more than cover the total medical requirements, whether the opium be used as such or as one of the manufactured alkaloids. This figure allows 140 milligrams of raw opium per head per annum to supply the world's requirements in opiates.

Different countries of the world use opium narcotics to very different degrees; thus Great Britain, Norway and Sweden use large quantities of crude opium, about three times as much per head as that used by the United States; on the other hand, Great Britain uses only half the amount of morphine per head that is employed in the United States. Great Britain uses more heroin per head than any other European country: thus for Germany the average in milligrams per person is 5.5, Switzerland 6.3, Sweden 3.9, Great Britain 20.6, and Canada 29. These figures are taken generally for the years 1925 to 1928.

ADDICTION IN VARIOUS COUNTRIES

America uses more narcotics for medicinal purposes than other countries, though the difference is not very great. Taking the question of morphine alone, America requires 245 milligrams per head, Europe 152 milligrams, Asia 8, and Africa 24.5. It may be that in America people are more sensitive to pain than in other countries. Attempts have been made in the past to determine sensitiveness to pain in the people of different nations by psychologists using complicated apparatus, and some statistics have been obtained of the number of women who employed anodynes during normal parturition. The figures obtained were—for the United States 70 per cent, Great Britain 50 per cent, and for Spain and Russia 5 per cent. The figures are interesting principally as showing the opportunities available for obtaining anæsthetics, for few, if any, women would prefer to undergo labour without some form of anæsthesia.

I have shown what are the genuine requirements of narcotics in the world, and I will endeavour to answer the important question—whether addiction to the opium narcotics and cocaine has increased since the war.

In Britain addiction is certainly rare, and the Departmental Committee in 1926 had evidence to show that it had diminished since the war. Before the war cocaine was rarely used in Great Britain. In the early days of the war cocaine users became plentiful in Paris and the habit spread to London; but it has now practically died out in England, though I have met persons, since the war, who openly used cocaine on occasion, but they were not addicts; they indulged periodically in a dangerous drug, running the terrible risk of addiction; but, worse than this, they were a menace and danger to others.

In France to-day addiction is not common except among certain groups of people, such as artists, demi-mondaines, and the idle rich. Opium smoking may be indulged in in the large ports like Toulon and Marseilles, and opium dens are not rare in Paris. The smoker in Paris is introduced into a room, furnished in the Indian style with silk embroidered cushions, softly veiled lights, and low divans; often a Buddha may be seen peeping out between the curtains. These dens are frequently visited by midnight parties, and the smokers are generally novices and strangers.

Cocaine may still be bought in Montmartre and some of the night cafés. This cocaine is usually diluted with sodium sulphate, starch, or other harmless diluent, usually to about 50 per cent, an ingenious means of increasing the profits of the traffickers.

France, though not a country where addicts flourish, is a country which manufactures large quantities of narcotic drugs. Thus in 1915 it exported to Greece 11 tons of morphine, and in 1928 it produced 15,000 kilograms of morphine. France and Russia publish no figures of their medicinal use of morphine, but France publishes her imports of opium and exports of narcotics, and if the exports are subtracted from the imports, a figure representing the domestic consumption should be obtained; but this figure gives a minus number and represents a consumption per head of the population of about minus 80 milligrams.

Germany is attacking the problem of addiction in a thorough and scientific manner. She recognizes from hospital statistics that her addicts are increasing in number. Figures obtained from such sources should, however, be regarded only as indications of the state of affairs; they show that during the years 1923 to 1924 the male addicts receiving hospital or sanatorium treatment were 200 per cent higher than in pre-war days, and that in Germany for every 10,000 inhabitants there are 0.3 male and 0.1 female addicts. This increase has continued up to 1928 and includes not only addicts to morphine, but also those to the newer alkaloids. Germany's annual estimate for domestic needs is for morphine 1,600 kilograms, cocaine 450 kilograms, and heroin 50 kilograms, represented in each case as their salts; her annual exportation of these is about 10,000 kilograms.

In Germany the sales of beer also are showing a considerable increase; in 1923-24 about 45 litres per person per annum were used, while in 1927-28 this figure had risen to 80, although in pre-war days it stood at 102. This is, however, mainly an indication of improving social conditions and affluence: no doubt typewriters and cinema shows are increasing at the same rate.

In Egypt before the war, other addiction than that to hashish was negligible. This changed during the war, and four or five years ago the principal addiction was to cocaine. The Chief of the Cairo Police stated that the Egyptian nation was being ruined by cocaine, and that the hospitals, prisons, and asylums were filling

with victims. But to-day heroin has replaced cocaine, and the hawkers penetrate Egypt, visiting even the smaller villages. Statistics show that nearly 25 per cent of those confined to prisons are charged with drug offences. Foreigners are mainly responsible for the importation of these drugs into Egypt; those living in Egypt are outside Egyptian jurisdiction and are tried by their own Consuls, so that uniformity in justice is lacking. Egypt for many reasons is a happy dumping ground for narcotics. Russell Pasha, the director of the Central Narcotics Intelligence Bureau, estimates the addicts at 100,000, and he believes this number is increasing. Other estimates are much higher than this, but Mr. Russell's figure is truly terrible when it is understood that the Egyptian population is not more than 14 millions.

These narcotics come from various sources; often they are manufactured in Switzerland and imported via Austria. Europe has much to answer for in its supply of narcotic alkaloids to the East. A single firm at Bussum in Holland exported 4,000 kilograms morphine, heroin, and cocaine within fifteen months, and 75 per cent of this went to China. It is small wonder that she should complain that smuggling of European alkaloids into her country demands at least as much scrutiny as the exports of opium out of it.

In China opium smoking has existed for a thousand years. Wine and moonlight were formerly the inspiration of the Chinese bard, but now the poetaster who writes a chaste ode to his mistress seeks inspiration in the opium pipe. Opium smoking was not, however, the terrible vice it was painted. The opium smoker takes his pipe in much the same way as Western nations take tobacco: he is usually precise in business, exemplary in habits, and rarely fuddled. A few establish a habit and must be continually increasing the dose, but it may be doubted if these are much commoner than the drunkard in the West.

The story is, however, entirely different with the alkaloids, as different as spirit is from beer or nicotine from a cigar, and it is here that European culpability must be considered. Narcotics were introduced and even encouraged by them; heroin was introduced to cure the smoking habit, and dicodide to cure the morphine habit. One firm in Europe manufactures one ton of heroin a month, though what becomes of it all is uncertain. In 1927 the Chinese Anti-Opium Association estimated that their country produced 7,000 tons of opium. Exactly how this figure was obtained is not stated, but it represents eight or nine times the legitimate medical needs of the world. The Chinese have also to contend with foreign settlements and concessions which are exempt from their jurisdiction and may be channels for prohibited drugs; it is even stated that some of them legalize opium smoking.

In the Malay Peninsula an opium monopoly exists and opium is sold only in government shops; also the smokers are registered. This policy was adopted by the government for the gradual suppression of the vice. It has much to commend it, as a sudden suppression must encourage addicts to search for other indulgences. Hong Kong has adopted the same principle, but here unfortunately smuggling from China is rife. In the Philippines, America has absolutely forbidden opium smoking under any conditions, though this, of course, does not mean that it has been suppressed.

Persia and Turkey, which probably raise a million kilograms of opium annually, issue no reports of their traffic. Unfortunately more than half of the States which are members of the League have not subscribed to the Geneva Opium Convention of 1925.

The United States is unfortunate in one respect, in that she has both an enormous sea and land frontier to protect against smuggling. Before the war, Dr. Wilbert, of the United States Public Health Service, estimated that there were 175,000 addicts in the country. His figures were based apparently on the importation and sale of opium through trade channels. The Commission of the Treasury, U. S. A., in 1921 estimated that the country contained at least one million addicts. In 1919 Miss Graham-Mulhall, First Deputy Commissioner in the Department of Narcotic Drug Control, State of New York, New York City, said that prescriptions containing from 40 to 90 grains of morphine or heroin were frequent, but that at the end of 1920 it was exceptional to find more than 10 grains. In the last ten years America has accomplished much. The manufacture or importation of heroin is forbidden, and the number of addicts has steadily diminished and is said to have reached pre-war level.

Narcotic drugs are among the most valuable weapons we possess to combat pain and suffering, and, whatever steps are taken to limit their illegal use, the greatest care is necessary to ensure that

restriction should inflict no hardship on the poor. Such a contingency might well arise if the number of factories was limited by international agreement. One method commends itself to many thoughtful people, which might be both simple and effective. Each manufacturing nation should have one factory over which the government would exert a direct and complete control including the price at which the products were sold. If such a system were adopted it would represent a real control of the narcotic traffic, for it is not the crude products, opium and coca leaves, which are a menace to civilization, but the chemical principles derived from them.

A LESSER CURVATURE GASTROPLASTY

(FLAP EXTERIORIZATION OF ULCER. THE FORMATION OF A GASTRIC POUCH)

BY JOHN ARMOUR,

Montreal

OF the various methods of surgical treatment for lesser curvature ulcer penetrating posteriorly the transgastric excision, devised by W. J. Mayo, is the only one which does not interfere with the nervous distribution in that region of the stomach. Stewart and Barber,[1] in their clinical and experimental studies on the motility of the stomach following segmentally resected and "triangularly" resected stomachs state that "All the segmentally resected stomachs have not emptied quite as effectively as normal stomachs, but somewhat more satisfactorily than "triangularly" resected ones. This difference in the emptying time may be due in part to the mechanical relations incidental to the gastrectomies themselves, but more probably (observations during experimental operations and post-operative tracing) due, in greater part, to the fundamental disturbances in the neuro-muscular motor mechanism of the stomachs." H. B. Devine[2] states that the emptying time of the stomach is delayed one hour following a wedge-shaped excision of a portion of the lesser curvature for ulcer.

The present method of gastroplasty is brought forward to avoid the possibility of interfering with the motor mechanism of the lesser curvature.

THE EXTRINSIC NERVE SUPPLY OF THE STOMACH

Vagus.—Modern text-books of anatomy state that the right vagus nerve, after helping to form the œsophageal plexus, resumes its course through the diaphragm behind the gullet to be distributed to the posterior surface of the stomach. Meantime the left nerve applies itself to the anterior surface of the lesser curvature of the stomach, to which it is distributed. These statements however are not quite correct. The œsophageal plexus, which is formed by the vagi, gives rise to an anterior and a posterior vagal trunk, each containing fibres of both vagi. This has been confirmed by degenerative methods in the cat by McCrea,[3] who makes the following statement: "The chief vagal branches lie along the lesser curvature but do not reach the pylorus; this receives its nerve-supply from above, from the hepatic branch of the anterior vagal trunk, which crosses high up in the gastro-hepatic omentum to reach the porta hepatis. The first portion of the duodenum is supplied in the same manner as the pylorus. The posterior vagal trunk supplies a large branch to the cœliac plexus and thus to certain of the abdominal organs, including the pancreas, kidneys, and small intestine. Its gastric division lies along the lesser curvature but does not reach the pylorus."

Sympathetic.—The sympathetic fibres arise in the cœliac plexus. The main nerves accompany the left gastric or coronary artery; a few fibres follow the inferior phrenic arteries; and the pylorus and pyloric antrum are supplied by fibres which associate themselves with the hepatic artery and are distributed to the stomach with the right gastric and right gastro-epiploic arteries.

OPERATIVE TECHNIQUE OF GASTROPLASTY ON THE DOG'S STOMACH: FLAP EXTERIORIZATION OF "ULCER"

The abdomen is opened by a right paramedian incision above the plane of the umbilicus. The skin surfaces are shut off by saline-moistened towels. The stomach is delivered into the wound. Curved stomach clamps are applied from above downwards, the posterior blade piercing the gastrohepatic omentum and passing into the lesser sac of the peritoneum (Fig. 1). Packs are introduced so as to exclude the area of operation from the general peritoneal cavity. A horseshoe-shaped incision is made through the seromuscular coat of the anterior wall of the stomach, going no deeper. This incision begins and ends one-half inch from the lesser curvature. The vascular anastomosis and the branches of the anterior vagal trunk thus remain uninjured. The seromuscular coat is dissected from the mucosa for a distance of about one-quarter of an inch towards the centre of the flap. The stomach is now opened at the medial edge of the bared surface. Fig. 2 shows the flap turned up with the margin of mucous membrane projecting beyond the seromuscular layer of the anterior stomach wall. The mucus is wiped off the gastric mucosa.

The lesser curvature and posterior wall are invaginated into the stomach and a second horseshoe-shaped incision is made through the mucosa only on the posterior wall of the stomach. This incision begins at one end of the previous inci-

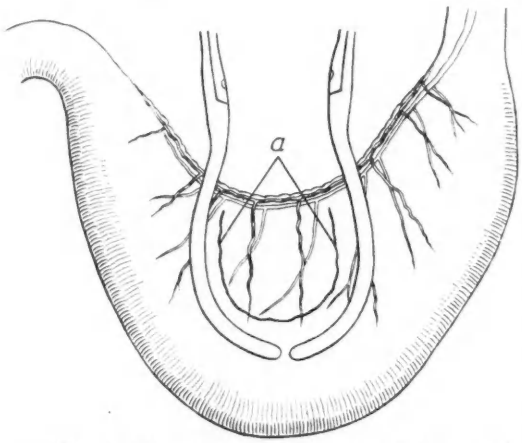

FIG. 1.—The anterior surface of a dog's stomach with clamps applied limiting the "ulcer area." The anterior vagal trunk and its branches are shown. The horseshoe-shaped incision, a, outlines the flap.

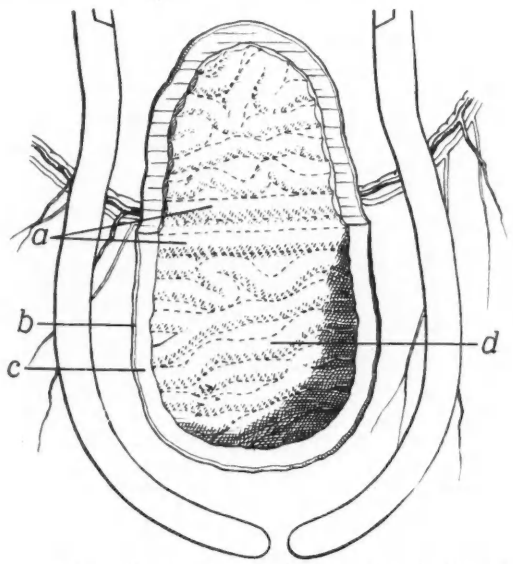

FIG. 2.—The flap is turned up exposing the interior of the stomach: a, the longitudinal rugæ of the lesser curvature; b, the sero-muscular layer of the anterior wall; c, the mucosal flap dissected from the seromuscular layer of the flap; d, the rugæ of the posterior stomach wall.

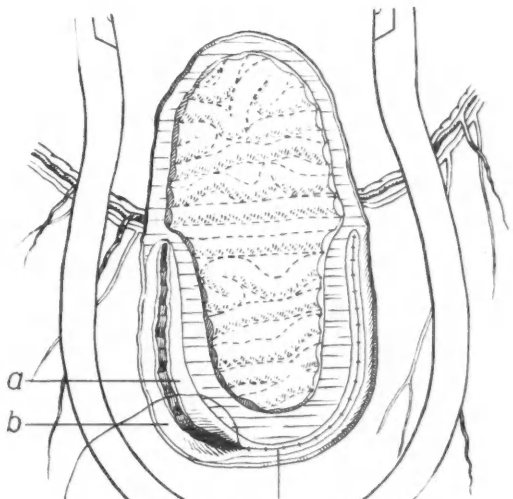

FIG. 3.—a, the mucosa of the posterior wall incised and reflected forwards; b, the mucosa of the anterior stomach wall; c, the suture closing off the body of the stomach.

sion, extending up across the lesser curvature, then down the posterior wall of the stomach and back up around the lesser curvature to the other end of the previous incision (Fig. 3). The mucosa on the side of the incision towards the clamp is dissected back towards the clamp from the sero-muscular layer for a distance of

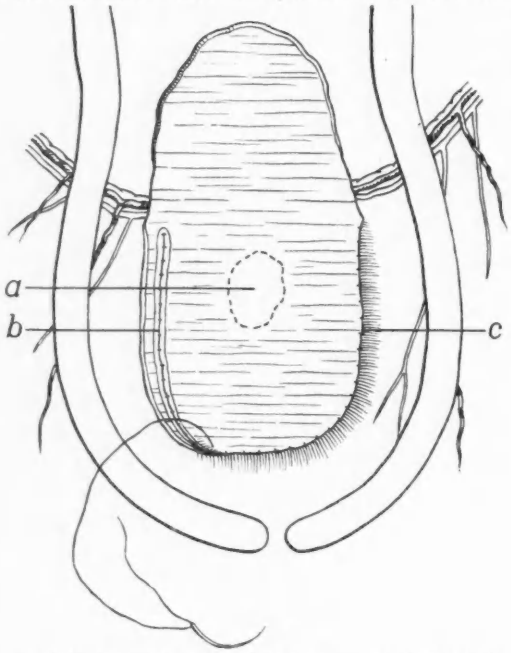

FIG. 4.—The mucosa has been removed from the "ulcer area": a, site of a supposed ulcer; b, the line of suture of the mucosa; c, the stitching of the sero-muscular layer of the anterior stomach wall to the mucous aspect of the similar layer of the posterior wall.

one-quarter of an inch. Thus two small flaps of mucosa, one on the anterior wall (Fig. 2 c and Fig. 3 b) and one on the posterior wall (Fig. 3 a), are continuous with each other at the lesser curvature of the stomach. The two lateral margins of mucosa, anterior and posterior, are approximated by a Connell suture. One begins the suture at the lesser curvature on the left and sews towards the right (Fig. 3 c). Thus the stomach is shut off from the "ulcer area." The mucosa is removed from the sero-muscular coat of the exteriorized area (Fig. 4). Then the closure of the stomach is completed by suturing the sero-muscular layer of the anterior wall of the stomach to the sero-muscular layer of the posterior wall by Lembert suture, the serous surface of the anterior wall coming to lie against the mucous aspect of the sero-muscular layer of the posterior wall (Fig. 4 c, Fig. 5 c). The flap is then turned down over the supposed "ulcer area" and held in position by a few sutures (Fig. 6). The abdominal wound is then closed.

Fig. 7 is a photograph of the operation carried out on an excised stomach of a dog. The "ulcer area" has been exteriorized from the stomach. The anterior sero-muscular flap is turned up showing the mucous surface of the posterior sero-muscular coat of the stomach.

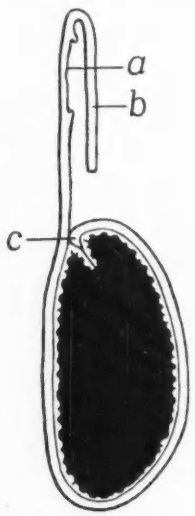

FIG. 5.—A sagittal section through the stomach at the plane of the mid point of the gastroplasty: a, the supposed ulcer represented as non-penetrating; b, the sero-muscular flap; c, line of suture of the sero-muscular coat of the anterior stomach wall to the posterior wall.

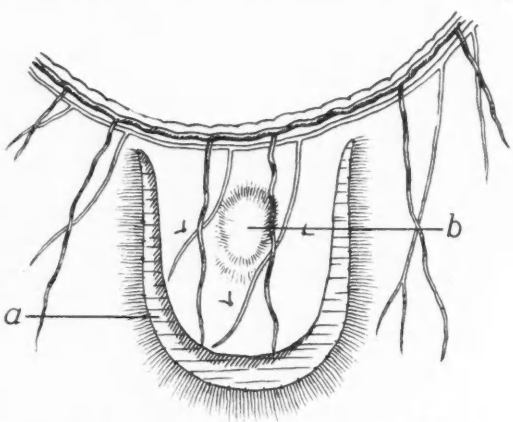

FIG. 6.—The flap has been returned to "fill up" the supposed ulcer and anchored by three sutures. The branches of the anterior vagal trunk have not been injured. a, the mucous surface of the sero-muscular coat of the posterior stomach wall; b, the "dimpling" of the flap in the "ulcer crater."

This operation, with sizes of flap varying from one-quarter to three-quarters the transverse diameter of the stomach, has been performed on a series of five dogs without infection or a death. The animals remained in good

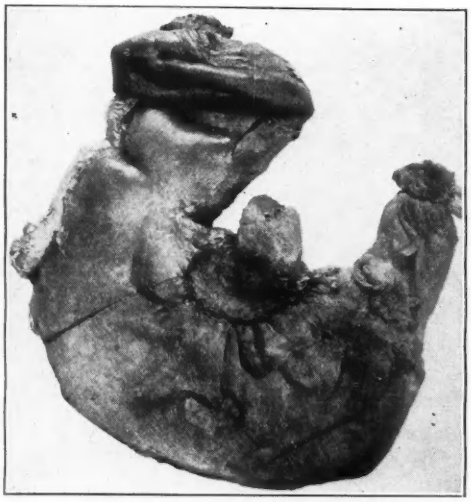

FIG. 7.—An excised dog's stomach showing the stomach exteriorized from the "ulcer area." The œsophagus is on the right. The margin of the greater curvature has been removed.

health, lost no weight, did not vomit, and retained a good appetite. Eight weeks later at post-mortem, there was no dilatation of the proximal portion of the viscus and no gross deformity in the way of contracture. Fig. 8 is a

FIG. 8.—The anterior aspect of a dog's stomach, the operation being done eight weeks before death, showing the tubularization of the lumen of the stomach without deformity. The œsophagus is on the right.

photograph of the anterior aspect of one of these stomachs, the flap extended three-quarters the diameter of the transverse axis of the stomach. Pre-operative and post-operative x-ray examinations were not done.

FORMATION OF GASTRIC POUCH

The following modification of the operation affords a new type of gastric pouch possessing certain probable advantages for physiological research. Investigations in this direction are being carried out and will form the subject of a later paper.

After delivering the stomach into the wound the distribution of the branches of the anterior vagal trunk is identified and the incision is so placed that the nerve supply to the flap is intact (Fig. 1).

A horseshoe-shaped incision is made on the anterior wall of the stomach through the sero-muscular coat beginning and ending one-half inch from the lesser curvature and extending about half way across the transverse diameter of the stomach (Fig. 1). The sero-muscular layer is dissected from the mucosa on the clamp side of the incision for a distance of one-quarter of an inch. The stomach is opened at this point, the flap turned up and the mucus sponged away. The lesser curvature of the stomach is invaginated into the wound. A second semilunar incision is made through the mucosa on the posterior wall, beginning at the end of the anterior mucosal incision, extending up across the lesser curvature, then down the posterior wall for about one-half the distance of the length of the flap and back around the lesser curvature to the other end of the previous incision. The mucosa is freed from the sero-muscular coat on each side of the incision for a distance of one-quarter inch. A small fringe of the anterior sero-muscular layer is removed after the mucosa has been freed around its margin. The stomach is now closed by Connell suture beginning at the lesser curvature on the right side of the field (Fig. 9 d). The clamps are released.

The free end of the flap is picked up with forceps and the edges are brought together to form a tube. This is possible because the mucous membrane on the posterior wall is only one-half the length of that on the flap.

The base of the pouch is now closed by approximating the mucosa as shown in Fig 9 c. One begins at the lesser curvature on each side, and approaches the mid point of the base of the tube. When this point is reached the tube is completed (Fig. 9 b). The sero-muscular layer of the anterior wall of the body of the stomach

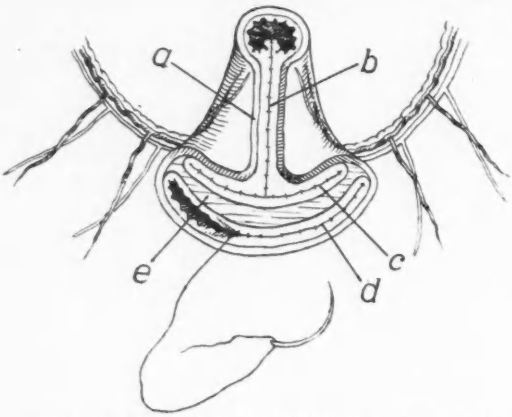

FIG. 9.—The pouch completed by suturing the edges of the sero-muscular coat of the flap: a, the suture line in the axis of the pouch; b, the base of the pouch completed; c, a second layer of sutures closing off the stomach cavity; d, the suture line approximating the mucosa of the anterior to the posterior walls of the stomach; e, the serous surface of the posterior stomach wall.

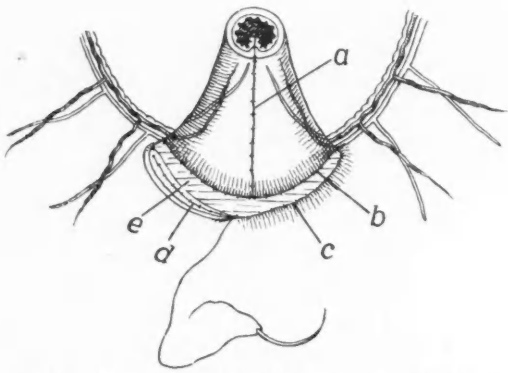

FIG. 10.—The method of constructing the lesser curvature pouch. The vagal distribution to the pouch is injured: a, the sero-muscular layer of the flap; b, and c, the suture line of the approximated edges of the mucosa of the flap; d, the suturing of the mucosa of the anterior to the posterior walls closing off the stomach; e, the serous aspect of the posterior stomach wall.

is sutured to the sero-muscular layer of the posterior stomach wall by Lembert suture (Fig. 10 c), the serous surface of the anterior wall coming to lie against the mucous aspect of the posterior wall. The base of the pouch is completed by a similar suture, the serous surface of the base of the flap coming to be against the mucous aspect of the sero-muscular coat of the posterior stomach wall (Fig. 10 b). The sero-muscular layer of the edges of the flap are sutured together along the axis of the pouch (Fig. 10 a). The free end of the pouch is brought out through a stab wound to the left of the mid line. The abdominal wound is closed in layers.

Fig. 11 is a photograph of the anterior surface of a dog's stomach with a lesser curvature pouch. The stomach has been opened just anterior to and parallel with the greater curvature. The pouch is projecting from the lesser curvature and points towards the pylorus. Fig. 12 is a photograph of the posterior surface of the same stomach. The pouch, pointing towards the pylorus, has been opened. There is little or no gross deformity of the stomach, especially of the posterior wall.

This method of gastroplasty is offered as a

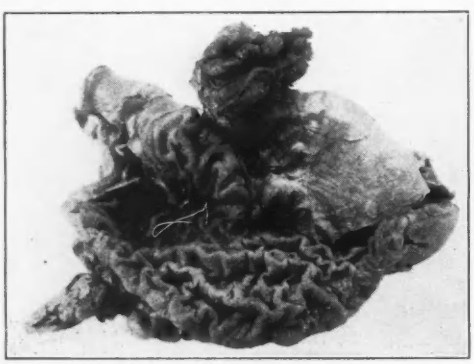

FIG. 11.—The pouch as seen in a dog's stomach. The pylorus is to the left. The stomach has been opened along the greater curvature. A portion of the abdominal wall has been left attached to the mouth of the pouch.

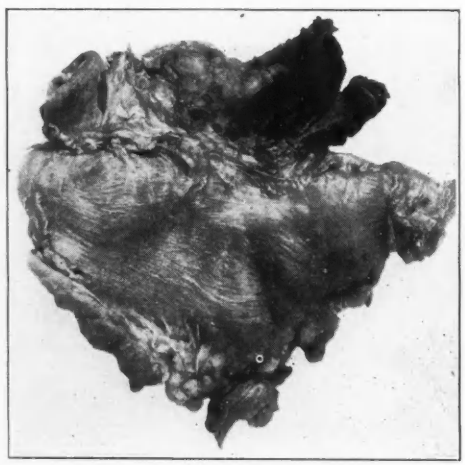

FIG. 12.—The posterior aspect of the same specimen as Fig. 11. The œsophagus is to the left. The pouch projecting towards the pylorus has been opened.

possible treatment for lesser curvature and posterior wall ulcer (penetrating posteriorly), as a substitute for the present day more radical partial gastrectomy, the stomach being left fixed to its bed. The lesser curvature pouch is a "positive" of the same technique.

In conclusion, I wish to acknowledge my indebtedness to Prof. D. P. D. Wilkie for the facilities of his Department and his kind criticism, to Prof. E. W. Archibald, my chief, and Mr. H. B. Devine, for their support in the possibility of this operative technique, and to the technical staff of the Department of Experimental Surgery of Edinburgh University for their skilled assistance.

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RETRO-DISPLACEMENT OF THE UTERUS AND ITS CORRECTION

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AN analysis of 100 cases of retro-displacement of the uterus has been undertaken with the idea of (1) investigating the usual causative factors, (2) determining the more common symptoms and associated lesions, (3) analyzing the results of correction from an anatomical and symptomatic standpoint, and (4) describing the type of operation found most useful.

Cases from private practice only are included, and complete pre-operative, operative, and post-operative records have been kept in each, extending over a period of from six months to eight years. No differentiation has been made between retroversion and retroflexion as they are frequently associated, and, symptomatically or surgically, such a division is seldom of importance. No cases with descent of the uterus in any marked degree, vaginal wall prolapse, or extensive damage to the pelvic floor are included, as these are essentially cases of uterine prolapse and beyond the scope of the present analysis.

FREQUENCY

Stacey[1] in 1,000 routine examinations, at the Mayo Clinic, on virgins with no associated pelvic lesions, found 20.2 per cent with a retro-displacement of the uterus, probably congenital in origin. Lynch[2] reports a large series of general patients showing 41.1 per cent with a similar condition. My own observation would indicate about 20 per cent of retro-displacements in non-parous women and 30 to 35 in parous women that had not been examined recently after delivery.

CAUSATIVE FACTORS

The following table shows what possibly might have been causative factors in each of my cases:

TABLE I

	Cases
Instrumental delivery	23
Post-partum infection	17
Appendicitis (probably acute)	7
Appendicitis (ruptured)	3
Simple post-partum subinvolution	21
Abortion with infection	13
Gonorrhœal infection—positive	8
probable	5
Infantile uterus and definite congenital conditions	7
Pelvic tuberculosis	2
No indication	12
Total	118

The large number with a history of instrumental deliveries is a warning against early interference before the os uteri is fully dilated, which results in damage to the pelvic diaphragm and especially the utero-sacral ligaments. A history of pelvic infection was found in 45 cases, largely post-conceptional in time. Also, 21 cases dated their symptoms directly to a neglected post-natal period. This makes a total of 76 obstetrical complications in 58 patients. The indications for better obstetrical care are very evident. The cases with infantile uteri all had associated lesions which made operation necessary. In eight cases a laparotomy was performed for appendicial disease and a uterine displacement corrected as an associated condi-

tion. Five cases showed a firmly adherent retroversion with no disease evident as a primary factor. Eighty were married and 20 single. The ages were as follows: 11 under 20 years; 56 between 20 and 30; 30 between 30 and 40 and 3 between 40 and 45 years of age. All were in the active child-bearing age and, on this account, there was no vaginal interference except what was considered necessary to secure symptomatic relief.

SYMPTOMS

About 50 per cent of retro-displacements apparently have no symptoms directly referable to the condition. A small group (about 20 per cent) of uncomplicated cases had very definite complaints, as is proved by their relief on adjustment and the application of a properly fitted pessary. The majority of symptoms are referable to associated disease, either causative or consequent in relation to the displacement. Bevan[3] and Cabot state that uncomplicated retroversion seldom causes symptoms. Crossen and Polak state that only about 4 per cent of such cases are symptomless. Ward claims that simple displacement produces sufficient mechanical interference with the vascular mechanism and drainage to produce symptoms or pathological conditions which will need correction at a later date. My group gave the following as their main complaints. For convenience in charting, I have combined the initial symptoms and the results of operative interference on each.

TABLE II

Symptom	*Total*	*Cured*	*Improved*	*No Change*
Backache	58	42	13	3
Dysmenorrhœa	76	59	12	5
Menorrhagia	46	40	4	2
Scanty menstruation	27	20	5	2
Leucorrhœa	45	36	7	2
Urinary frequency	44	39	4	1
Sterility (secondary)	18	11		7
Sterility (primary)	13	3		10
Hypogastric pain	78	67	10	3
Dyspareunia	17	15	1	1
Pelvic pressure	39	36	2	1
Abortion	15	8		1

Rectal tenesmus or difficulty at stool was not recorded in a single case, although mentioned in modern text-books as a common symptom.

The above list becomes much more instructive when considered in conjunction with the associated pathological conditions present at the time of operation. These were:—

TABLE III

	Cases
Pathological mobility of the kidney	7
Visceroptosis	19
Uterine fibroids	9
Endocervicitis	20
Cystic ovarian degeneration	42
Tubal inflammation	22
Femoral hernia	1
Broad ligament varicosities	17
Adherent retroversion	41
Appendix (pathological)	48
Perineal relaxation	24
Infantile uteri	7
Pelvic tuberculosis	2

Only 14 cases, at operation, presented an apparently negative abdomen, beyond the uterine displacement. The occurrence of 26 cases with renal or intestinal ptosis clearly indicates the close association of abdominal and pelvic ptosis as a part of poor muscular development, lack of proper tissue support, postural defects, and general under-development. The small number of perineal and cervical lesions is explained by the fact that cases with pronounced descent of the uterus or extensive relaxation of the vaginal wall and perineum were not included, but were classified as cases of uterine prolapse and not justifiably subjected to extensive vaginal surgical repair so early in life. Seventeen cases with broad ligament varicosities (16 associated with ovarian cysts) and 42 with ovarian cystic degeneration strongly support Ward's statement as to the mechanical effect of uterine displacement on the vascular supply to the pelvic reproductive organs. Forty-five cases with leucorrhœa and only 20 with visible endocervicitis suggests a probable congestive type of endometritis as a mechanical factor. Where the fundus uteri was replaceable bimanually, operation was not advised, unless pessary adjustment gave marked symptomatic relief.

FAILURE TO RELIEVE

An analysis of my failures to produce symptomatic relief by operative measures reveals numerous reasons why we should not be too enthusiastic in our prognosis concerning such cases.

Backache.—There were 3 failures, probably from the following causes: scoliosis in the lumbar region; a marked degree of enteroptosis; and a definite sacro-iliac strain following a severe instrumental delivery. Thirteen cases of

partial relief from backache, making a total of 16 cases with some degree of pain left in this region, would certainly justify more intimate association with an orthopædist before too readily blaming the evident uterine displacement for the indefinite symptom of pain in the lumbar and sacral regions.

Dysmenorrhœa.—Five failures in cases of infantilism, recurrence, pelvic inflammatory exudate, and the development of ovarian cysts.

Menorrhagia.—Two failures, probably caused by extensive inflammation from old tubal infections.

Scanty menstruation.—Two failures, both in cases with infantile uteri.

Irregular menstruation.—Two failures, one with an infantile uterus and another with a tubo-ovarian mass.

Leucorrhœa. — Two failures, one where a tracheloplasty should have been done, and the second unexplainable.

Urinary frequency.—One failure in a case with pyelo-nephritis. The occurrence of this symptom in 44 cases and its relief in 39 by operation is probably in excess of the proportion that would be obtained in a larger series of cases.

Sterility (secondary).—Eleven became pregnant, one after the removal of six fibroids, one after a simple replacement and a third after a suspension, resection of an ovarian cyst and a salpingostomy. All had normal deliveries.

Only 4 uncomplicated retroversion cases were operated on for sterility, and 1 was successful. Twenty-three cases have delivered normal children since operation (1 Cæsarean), 22 without dystocia, and none with a recurrence of the displacement. Four have had abortions, of which one was induced.

Hypogastric pain. — Three failures from causes such as recurrence, infantilism, ptosis. inflammatory exudate, and ovarian cystic degeneration.

Pelvic pressure.—One failure in a neurasthenic with marked general ptosis.

Dyspareunia.—One failure in a neurotic with intestinal ptosis, a prolapsed ovary, and moderate vaginal spasm.

Two cases have aborted since operation with no previous history of such an occurrence; 81 are perfectly well, 15 are distinctly improved, and 3 are failures. Ninety-eight have anatomical correction of their displacement, and 1 has a recurrence. One case died of general peritonitis, when nothing was found at operation to account for its occurrence.

Careful analysis shows that operation for uterine displacement, when considered in conjunction with the inevitable association of visceroptosis, skeletal or postural defects, endocrine dysfunction, old pelvic inflammations, mal-development of the reproductive organs, and the uncertain results of surgery in cystic ovarian degeneration, must not be undertaken with too optimistic expectations as to complete success. The infantile and visceroptotic type are better left alone unless very evident indications for surgical interference are present. More radical correction of the pelvic floor would have improved my results, but indiscriminate perineal repair in young women is not sound surgery.

Dyspareunia is usually due to ovarian displacement or tubal disease and should be easily relieved. Abortion, as a complication, was uncommon, and subsequent pregnancies not frequent enough to be conclusive.

Sterility was usually accounted for by associated disease and I believe that simple uterine displacement, or its correction, has very little influence on conception. Vaginal plastic repair is essential when uterine prolapse is at all pronounced. Uterine retroversion without associated disease is not an indication for surgical interference in the majority of cases. Undoubtedly the symptoms of retroversion are largely those of associated pathological conditions, and indications for operation should be based on those associated conditions, as symptomatic relief is largely due to their correction.

Other interesting facts are revealed in a list of operations that had previously been performed on this group.

TABLE IV

	Cases
Acute appendicitis	9
Appendicial abscess	1
Chronic appendicitis (11 McBurney incisions)	13
Pelvic abscess (drainage)	2
Cholecystectomy	1
Ventro-suspension (Gillian 2, Simpson 1 and Baldy-Webster 1)	4
Oöphorectomy	4
Salpingectomy	3
Cervical dilatation	11

Ten of the patients with a McBurney incision complained of the same symptoms as before their previous operation. The question arises as to the justifiability of this incision for chronic abdominal pain in a female.

The additional surgical procedures carried out in the above group were as follows:

TABLE V

	Cases
Cervical cauterization	2
Cervical repair	12
Cervical dilation	16
Tubal resection	14
Ovarian resection	29
Appendectomy	48
Perineorrhaphy	14
Myomectomy	9
Femoral herniotomy	1
Ovarian suspension	4
Cæcal suspension	3
Utero-sacral lig. plication	8
Sigmoid used to obliterate a denuded cul-de-sac	13

Attention is drawn to the fact that our greatest fear in pelvic surgery is post-operative adhesions of the small bowel in the pelvis. Denuded areas must be covered with peritoneum, and where such tissue is not available the sigmoid is readily fastened across the space between the sacral promontory and the posterior surface of the uterus and broad ligaments. I have never seen it give any trouble afterwards. Utero-sacral ligament plication is extremely useful to maintain the cervix in a posterior position, but is more applicable in cases with uterine prolapse. Resection of the tubes and ovaries in young women must not be too radical, and yet no grossly diseased tissue should be left to cause future trouble. Ovarian suspension was only found necessary where a Baldy-Webster or Simpson suspension was performed. I used a vertical paramedian incision in eight cases and a transverse lower abdominal in 92, only using the former in the presence of obvious infection.

TREATMENT

Only two methods will be discussed.

A. *By pessary.*—The pessary is an extremely useful adjunct, whose usefulness is greatly underrated and whose application is equally abused in many cases. It serves the following purposes:

In early post-partum displacements with subinvolution, provided a fair pelvic floor is present, it will give a permanent correction in the majority of cases. In mobile retroversions of long standing it gives symptomatic relief in about 60 per cent of cases, although the displacement recurs on its removal, but this test of corrected displacement gives an excellent indication as to the result that may be expected from operation. It is useful in the case of patients refusing operation or where surgical interference in contraindicated, but it should not be employed when the uterus is not replaceable. It is essentially only a mechanical brace or splint to the vaginal wall, requires constant care, and cannot be recommended for continuous use. I prefer an assortment of Hodge, Smith, or Thomas-Smith types for simple displacements, and the circular watch-spring variety when the deficiency of the pelvic floor is pronounced.

B. *Surgical.*—Since 1840, when Alquié first attempted shortening the round ligaments through the inguinal canals, on the cadaver, about 300 slightly different types of operation have been described, constituting one of the curiosities of surgical literature.

In choosing any operation for retro-version the following objects must be kept in mind. The fundus uteri must be kept forward but freely movable; the cervix must be kept back; the ovaries and tubes must be well suspended and free of mechanical obstruction; no free intra-abdominal bands must be left; the operation must withstand the test of pregnancy; a large part of the normal uterine support must be restored, especially the pelvic floor.

I shall now group the more common operations according to the method of approach and add a few remarks of individual criticism.

Vaginal shortening or plication of the round ligaments.—This method is technically difficult, surgically incomplete, and the results uncertain.

Round ligament shortening through the inguinal canal (*Alexander*).—No inspection of the pelvis or correction of associated lesions is possible. It is only applicable to cases seldom needing operation.

Suspensions by the round ligaments through the rectus sheath or muscle (Gillian-Ferguson, Olshansen).—They produce free bands and open spaces in the lower abdomen (unless modified), with a distinct liability to incarceration of herniated gut or omentum. I have had two cases of bowel involvement with obstruction lateral to the suspending ligament, and one of incarcerated omentum over the fundus

uteri. Bevan[3] reports over 20 cases and numerous others are on record. The fundus is drawn too close to the anterior wall and may become adherent to the peritoneal incision. Mobility of the fundus is too limited. The ovaries and tubes tend to prolapse, and they exert no pull to keep the cervix backward. They depend solely on the round ligaments for support and as they have little or nothing to do with sustaining the uterus in position they cannot be expected to withstand pregnancy. Barrow[4] reports 19 per cent recurring after delivery, while Hurd[5] and Ferguson[6] admit they show the largest group of recurrences in operations analyzed by them.

Plications of the round ligaments anterior (Coffey) or posterior (Baldy-Webster) to the uterus.—They immobilize the strongest part of the ligaments and hence recurrence is not infrequent. Barrow[4] reports 8 per cent. Zimmerman[7] reports 28 per cent of recurrences, which must be considered as due to faulty technique. These plications do not support a prolapsed ovary or tube, but are admirably adapted to cases with infection, as no dissection is necessary and the folded ligament can be used to cover over the stump of removed adnexa.

Simple plication of the round and broad ligaments (Bissell[8]).—This is technically more difficult, is not suited to cases with infection, and sutures placed in the posterior leaf of the broad ligament may be dangerous. On the other hand it uses the whole broad ligament as a means of support, and ovarian suspension is excellent. Hurd[5] reports its permanency after pregnancy as very excellent.

Ventro-fixation.—This method is not permissible during the child-bearing period. The fixed fundus is usually tender and such an operation is never necessary except in most severe cases of prolapse.

Round ligament shortening through the area of the internal ring (Simpson, Crossen, etc.).—Anatomically, this is the normal mode of approach and direction for support. No free bands or folds are produced and the strongest part of the round ligament is left as the support. The fundus is freely movable and there is a decided tendency to correct ovarian prolapse.

I used the following technique in 87 of the cases analyzed, and believe it meets the requirements indicated better than any other method I have employed. Only one patient had a recurrence, but her uterine ligaments were extremely delicate and a previous suspension by a most excellent surgeon had been unsuccessful.

The abdomen is opened through a transverse lower abdominal incision just above the pubic hair line. The transverse incision extends down through the anterior sheath of the rectus muscle which is dissected free from the anterior surface of the muscles. Access to the peritoneal cavity is gained by separating the recti muscles and incising the peritoneum vertically. All additional surgical procedures are carried out or determined upon. The round ligament is picked up by a suture, about 1½ inches from the uterine cornu, and an Ellis forceps placed 1 inch lateral to this point. Under tension the intervening ligament is split longitudinally with a scalpel, and a curved flat bladder forceps passed through the opening. The two leaves of the broad ligament are now separated, first down along the uterus to the base of the broad ligament, and then laterally out to the pelvic wall and to the internal inguinal ring. This separation must be complete, especially along

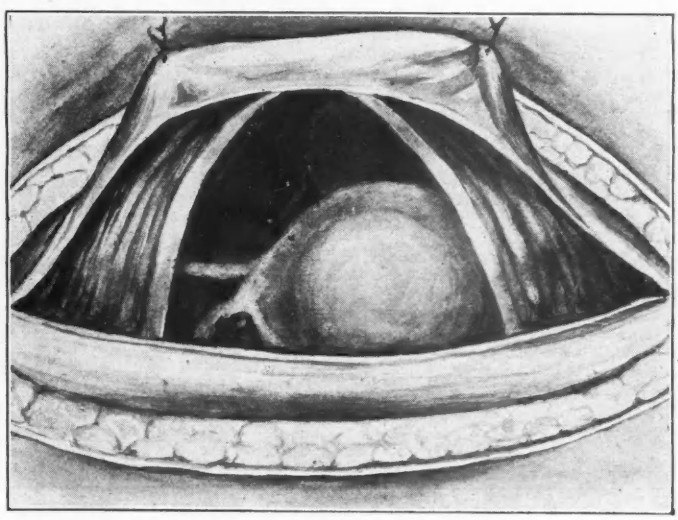

FIG. 1.—Preliminary incision.

the lateral border of the broad ligament. The vessels are always found on the posterior leaf of the ligament and with ordinary care, hæmorrhage never occurs. A curved forceps is now passed through the lateral angle of the rectus sheath toward the internal ring, then forced subperitoneally into the space between the separated broad ligament leaves and out of the opening in the round ligament, to pick up the original suture (see Fig. 3). On withdrawing the forceps the suture will be seen to invaginate the medial into the lateral portion of the broad ligament. As tension is applied it is realized that the broad ligament is being used as the support and not alone the delicate round ligament. The pull is directed toward the cervix, which must move backward, and the tension is nearly all in the base of the broad ligament extending from the internal ring toward the cervix and lateral uterine wall, with a relatively loose upper border or round ligament. The ovary is nearly always found well up on the lateral pelvic wall. The suture pulls the excess ligament through the deeper abdominal wall layers into the lateral angle of the rectus sheath. Here it is sutured with chromic gut to the under surface of the rectus sheath. The opposite side is treated in a similar manner. In many cases the invaginated anterior leaf of the broad ligament may be secured by one or more sutures. I have never placed sutures in the posterior layer. The uterosacral ligaments are plicated if abnormally lax, and the abdominal incision is closed in any approved manner.

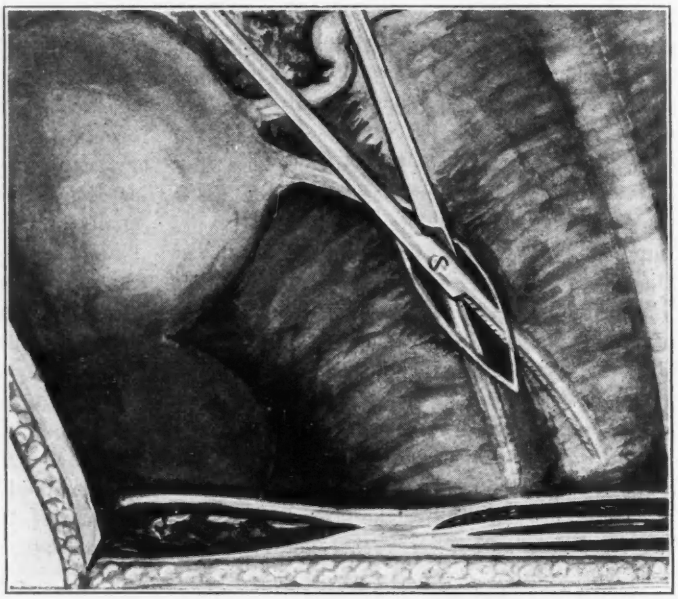

FIG. 2.—Forceps splitting leaves of broad ligament.

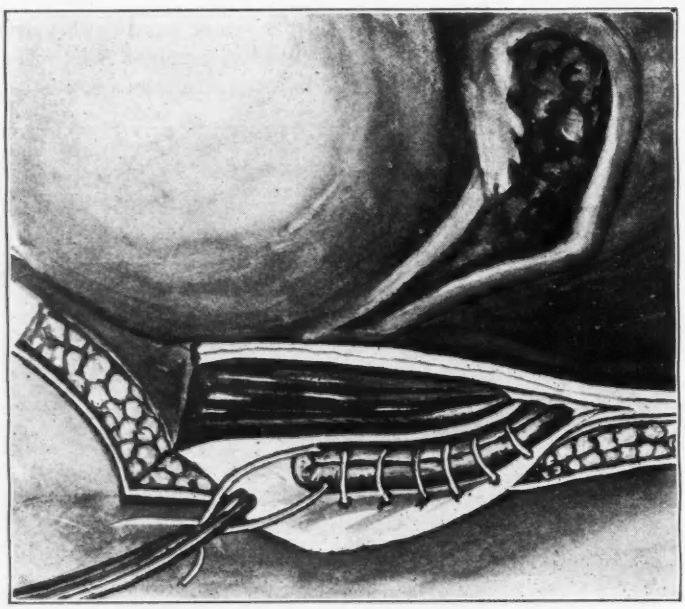

FIG. 3.—Final fixation of round ligament with plication of broad ligament.

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THE INFECTION OF SURGICAL WOUNDS WITH DIPHTHERIA BACILLI*

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DURING the course of diphtheria, infection of the skin, wounds, abrasions and eczematous areas with *B. diphtheriæ* may occur, but infection of surgical wounds with these bacilli, in the absence of clinical diphtheria, is rare, and especially so in civil practice and in civil hospitals. There is not a record of such a case in the Montreal General Hospital. For this reason the report of a case occurring in a civil hospital, and a short discussion of the presence of *B. diphtheriæ* and diphtheroids in wounds in general, their clinical importance, and the means of differential diagnosis between them should be of interest.

In addition to the rarity of *B. diphtheriæ* infections of wounds it is very difficult to make an exact clinical diagnosis of the condition. Unless one has already seen such an infection, and is acquainted with its varied clinical picture, he may not even associate diphtheria bacilli with infection of any given wound. Even though strongly suspected clinically, and supported by the findings of a direct smear, *B. diphtheriæ* infection cannot be positively determined without a full bacteriological examination. There are several closely allied diphtheroid bacilli, some of which may resemble *B. diphtheriæ* in the direct smears so closely that a differential diagnosis between them may be very difficult or even impossible. Even where an organism has been proved by culture to be *B. diphtheriæ*, the question of its virulence or non-virulence remains to be determined by tests for specific toxin. Unless all these factors are considered, a positive diagnosis of virulent *B. diphtheriæ* infection of wounds cannot be made with full assurance.

In the following case report some of the problems are illustrated.

CASE REPORT

This patient, an adult female, sustained an injury to the right knee about May 16, 1930. When seen by a surgeon on June 30th there was an uncomplicated fracture of the patella, with separation of the fragments. She was admitted to a hospital on July 3rd. The knee was prepared for operation with ether, alcohol and mercurochrome. This application was repeated twice on July 4th and again on the morning of July 5th, when the fractured patella was encircled with silver wire, reinforced by kangaroo tendon. The diary of the case contained the following notes.

"July 6th—There was considerable pain and the temperature rose to 100° F. July 7th—Rising temperature and increasing pain. Wound dressed. Serum under skin flap. Clip removed and serum expressed. July 8th—Discolouration of skin at edges of flap, and seropurulent discharge. July 9th and 10th—Much the same as on July 8th. Discharge becoming more purulent. An area of skin about one-half inch wide around medial edge of flap is greyish white."

During the next six days the purulent discharge continued and the tissues began to melt away with alarming rapidity. The appearance of the wound now suggested very strongly the presence of a high blood sugar, despite the fact that the urine was repeatedly examined and was always negative for both sugar and acetone.

July 15th—Smears taken and culture made. *B. diphtheriæ* found in large numbers. July 16th—10,000 units anti-diphtheritic serum given, insulin 5–0–5, and special diet.

July 20th—Cultures were again taken. At this time, four days after the administration of 10,000 units of diphtheria antitoxin, direct smears showed only one to two bacilli of the morphology of *B. diphtheriæ* to eight microscopical fields, a striking contrast to the large numbers seen in the original smear. Though scarce, these bacilli were proved to be virulent *B. diphtheriæ*. Wound improving. Five thousand units of anti-diphtheritic serum given.

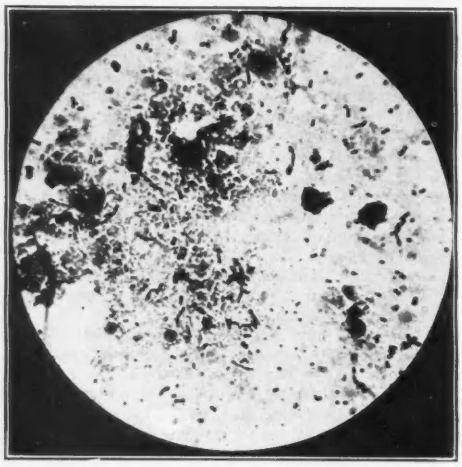
"After July 20th the wound continued to improve, although a section of skin flap, about ¾ by 3 inches completely separated as a slough. The silver wire also became free and the patella was again separated. By August 8th the temperature had been normal for the past few days; the pus discharge was negligible, and the healing lesions showed clean, healthy, granulating surfaces. There was no paralysis or other evidence of post-diphtheritic sequelæ. The temperature was never above 101° F. The usual range was from 99° F. in the morning to 100° F. in the evening."

The clinical diagnosis was infection of surgical wound with virulent *B. diphtheriæ*.

Direct smears taken from the wound on the 10th day after operation and stained with Loeffler's methylene blue, showed bacteria, polymorphonuclear leucocytes and mononuclear cells, the former cells predominating. The organisms found consisted of a few staphylococci and streptococci and numerous bacilli. The bacilli were lying parallel to each other and at sharp angles, and occurred singly and in clusters of 3 to 10. They appeared as slender, straight, or

* From the Department of Pathology, the Montreal General Hospital.

slightly curved rods, varying in length, thickness and shape, and showed irregularity of staining. Some were barred, others had a beaded appearance. Clubbed forms were present. With Ponder's differential stain, the bacilli showed very striking bipolar or unipolar metachromatic granules. A tentative diagnosis of *B. diphtheriæ*



Direct smear from a surgical wound infected with *B. diphtheriæ*. Note the large number of diphtheria bacilli, which occur singly and in groups; barred and clubbed forms are present.

was made from the direct smears, and the surgeon was notified.

Primary cultures made on Loeffler's blood serum slants, resulted in a mixed growth, consisting of *S. aureus*, a non-hæmolytic streptococcus and bacilli in large numbers. The bacilli were in every way morphologically similar to the Klebs-Loeffler bacillus.

In order to obtain the bacilli in pure culture, various dilutions were made on plates of Loeffler's blood serum, and incubated at 37°C. for 24 hours. One plate showed some 30 small whitish glistening colonies. Stained smears from these showed organisms similar in every way to Klebs-Loeffler bacilli.

For the purposes of further identification, stroke transplants were made from several colonies to fresh plates of Loeffler's blood serum. Growth in 24 hours showed pure cultures of well separated, slightly opaque, whitish colonies. Smears from these showed bacilli which were in every way typical, morphologically, of diphtheria bacilli. Barred forms, and clubbed varieties were especially noticeable. In 48 hours, the colonies were about 1 mm. in diameter, were more opaque, and showed a slightly cream coloured pigmentation. The bacilli stained intensely, showed some increase in length, were heavily barred and the polar granular staining was very distinct. In 72 hours, a slight increase in the size of the colonies was seen; the largest were 1.5 mm. in diameter. Smears showed the beginnings of involution forms. Typical barred and beaded bacilli were present. Incubation for several days afterwards produced no further increase in the size of the colonies; but a marked increase of involution and branched forms was noticed.

From the above, it will be seen that the bacilli isolated, showed both the morphological and simple cultural characteristics on Loeffler's blood serum, of *B. diphtheriæ*.

In order to further study the cultural reactions of the bacilli, various sugars were inoculated. The results are given in the following table:—

Dextrose	Saccharose	Lactose	Dextrin
+	–	+	+

+ acid formation – no reaction

The combined bacteriological study proves that the bacilli were true *B. diphtheriæ*.

In testing for virulence the method recommended by Majors James S. Simmons and Charles G. Sinclair, of the Medical Corps, United States Army, was employed. Two normal guinea pigs, each weighing 250 grams, were taken, one of which was inoculated subcutaneously with 250 units of diphtheria antitoxin. Twenty-four hours later both animals were inoculated subcutaneously in the right inguinal region with 4 c.c. of a suspension in 10 c.c. of normal saline of the diphtheria bacilli, obtained from a 24-hour culture grown on a Loeffler's blood serum slant. After four days, the guinea pig which had been protected by antitoxin was unaffected, beyond a slight reaction at the site of inoculation. The pig which had received no antitoxin showed in 24 hours, an area of hard œdema and infiltration about the site of inoculation, extending to the right lower costal region. In 48 hours, there was redness at the site of inoculation, and a band of œdema extended up to the right axilla and across the abdomen to the left side. In 55 hours, this pig was dead, and an autopsy was immediately performed. The external findings were similar to those noted at 48 hours.

On exposing the subcutaneous tissue marked gelatinous and sero-sanguinous œdema was encountered. This was most noticeable at the site of inoculation, where there were many petechial hæmorrhages, and dilated blood vessels. The œdema extended to the axilla on the side of the inoculation, and across the mid-line of the abdomen. There were also enlarged adrenals with hæmorrhage in their medullæ. Microscopic examination confirmed these gross findings. The animal inoculation established the virulence of the organism.

We have been unable to investigate the source of infection, for the reason that the patient was not in the Montreal General Hospital. A series of swabs were taken from the nose and throat of the surgeon who operated upon the patient, and planted on blood serum. No diphtheria bacilli or diphtheroids were found.

There are several pertinent questions involved in this case. Some of them are of sufficient importance to warrant a general review of the rôle that *B. diphtheriæ* and diphtheroids play in surgical wounds, and the bacteriological procedure by which these organisms are separated and identified and their toxicity determined.

It has been known for a long time that *B. diphtheriæ* may be present in surgical wounds and that the strain may be a virulent one. This possibility has been recognized as occurring in the absence of clinical diphtheria, and even in the absence of diphtheria bacilli harboured by the patient. It was not, however, until the Great War, that the presence of *B. diphtheriæ* in wounds became of general medical interest, as well as of diagnostic importance. There is no doubt that the clinical aspect of many infected war wounds showed characters somewhat similar to diphtheria, and that many more contained bacilli which in direct smears presented the morphology of *B. diphtheriæ*. It is less certain, however, that the bacilli found in these smears were true diphtheria bacilli and not diphtheroids, and still less certain that they were virulent *B. diphtheriæ*. It will be shown that in many of these cases, in fact the greater number of them, when a diagnosis was made on a direct smear alone, the bacilli were diphtheroids, and not true diphtheria bacilli.

We have already referred to the difficulty of drawing trustworthy conclusions as to infecting organisms from their morphology in direct smears. This is true in general, and especially so when dealing with diphtheria bacilli, and closely allied organisms. We are informed that bacteriologists working in the war zone in France early recognized diphtheria-like organisms in direct smears from wounds of various kinds, and appreciated the importance of studying them in detail. There are several reports on infection with *B. diphtheriæ* in war wounds. One of the earlier ones is "A Report of an Outbreak of Diphtheria Wound Infection among Returned Soldiers", by Majors Fitzgerald and Robertson. They report *B. diphtheriæ* in 32 out of 67 cases of suppurating wounds, for the most part amputation stumps. The diagnosis was made chiefly upon the morphology of the bacilli. In only a few cases were the organisms isolated in pure culture and tested for virulence. One or two were proved capable of producing toxin; others were much less toxic. Another paper on the subject is "A Report of 60 Cases of Wound Diphtheria", by 1st Lieutenant J. H. Hartsell and Major Myron L. Morris of the Medical Corps, United States Army. These officers state that the diagnosis of *B. diphtheriæ* was made principally upon morphological, and, to some extent, upon biological characters. Only one strain was tested for virulence; this gave a positive result.

The above investigations, like most detailed bacterial studies in active war hospitals, were made under great difficulties and under the stress of war. They, however, leave the impression that diphtheria bacilli are commonly found in war wounds. These, and other reports led the Canadian Army Medical Corps in England to undertake a study of war wounds, with especial reference to the presence of *B. diphtheriæ* and diphtheroids, and to test the virulence of any true diphtheria bacilli recovered. Such an investigation was important for several reasons. One of the chief was the fact that *B. diphtheriæ* infections of wounds could be followed by the same sequelæ as when the infection is in the throat. One such case is that of Reinhold's. In this case, a cholecystectomy wound became infected by diphtheria bacilli. This was followed by paralysis of accommodation and of the uvula, lesions not uncommon in untreated or improperly treated diphtheria of the throat.

A study was made of 306 cases of suspected infection of wounds by *B. diphtheriæ* in three

military districts. The results can be regarded as trustworthy, as a full bacteriological investigation was made.

The following two tables summarize the report.

TABLE I

Laboratory and observer	Number of cases examined	Number affording true B. diphtheriæ	Number affording diphtheroids
No. 1. Canadian General Laboratory, Folkestone Capt. F. Adams	121	1	40
No. 16. Canadian General Hospital, Orpington Capt. C. Imrie	60	1	7
No. 15. Canadian General Hospital, Taplow Capts. A. G. Fleming and R. M. Janes	100	0	0
Capt. C. D. Farquharson	25	0	9
Total	306	2	56

The investigators add that exact statistics are difficult to arrive at, as for example, in the Folkestone Laboratory, out of 121 cases examined only 41 yielded bacilli, and of these only 24 were obtained in pure culture. A complete examination was made only on these pure cultures. The following table shows the relative frequency and sugar reactions of the diphtheria bacilli and the diphtheroids that were isolated in pure culture.

TABLE II

Dextrose	Lactose	Saccharose	Dextrin		Folkestone	Orpington	Taplow	Total number of diphtheroids
+	+	+	+	Wound diphtheroids Type I	0	1	5	6
+	+	+	-	Wound diphtheroids Type II	0	5	1	6
+	+	-	+	*B. diphtheriæ*, virulent	1	1	0	2
+	+	-	+	*B. diphtheriæ*, non-virulent	1	1	0	2
+	-	+	-	Wound diphtheroid, Type III (xerosis type)	21	0	2	23
-	-	-	-	*B. Hofmanni*	1	0	1	2

An investigation was also made in order to determine the source of infection. A striking absence of carriers of *B. diphtheriæ* and diphtheroids was found among the personnel of the various hospitals. This was especially true of *B. diphtheriæ*. In Eastbourne, out of 157 officers, non-comissioned officers, nurses and men, none were found to be carriers of *B. diphtheriæ* and only three strains of diphtheroids were isolated. At Orpington, 111 were examined; no *B. diphtheriæ* were found while 24 yielded cultures of *B. Hofmanni*, the common throat diphtheroid.

This carefully and fully prepared report offers a series of suggestions on Klebs-Loeffler infection of wounds, and lays down a procedure for distinguishing *B. diphtheriæ* and diphtheroid bacilli. They are as follows:—

1. The physician should be familiar with the clinical picture of wound diphtheria, varied as it is.

2. When the infection has been suspected as diphtheria, the following bacteriological examination should take place.

(a) Direct smears are made and stained with Loeffler's methylene blue and Ponder's differential stain. If bacilli are found, a tentative diagnosis can often be made.

(b) Cultures are made on plates or slants of Loeffler's blood serum. When the suspected bacillus has been isolated, cultural and morphological characteristics are studied.

(c) The organism is grown on the following sugar broths: dextrose, lactose, saccharose and dextrin. *B. diphtheriæ* reactions are as follows:

Dextrose	Lactose	Saccharose	Dextrin
+	+	-	+

The lactose is sometimes omitted.

(d) The diagnosis of virulence or non-virulence is made by a test for the formation of toxin. The method they recommend, and the one which we used, is that most commonly employed.

While wound diphtheria is rare the possibility of its occurrence should be borne in mind and when it is even suspected, a thorough bacteriological examination should be made. The immediate prognosis certainly does, and even the ultimate prognosis may, depend on an early diagnosis, as wound diphtheria, like diphtheria of the throat, successfully responds to diphtheria antitoxin. Delayed or improper treatment may be followed by extensive local tissue destruction, toxæmia, or the more remote sequelæ of diphtheria of the throat.

SUMMARY AND CONCLUSION

1. A case of infection of a surgical wound with virulent diphtheria bacilli, that occurred in a civil hospital, is reported. We have been unable to investigate the source of infection thoroughly.

2. A positive diagnosis of *B. diphtheriæ* infection of wounds cannot be made with certainty from a direct smear.

3. The virulence of a strain of *B. diphtheriæ* isolated from infected surgical wounds can only be determined by a virulence test.

4. Any wound that is suggestive of infection with *B. diphtheriæ* should be treated by the administration of antitoxin, and given a complete bacteriological examination.

5. Infection of surgical wounds by *B. diphtheriæ* does occur, but is very rare in civil life and not so common as it was once thought to be in military hospitals.

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THE RADIUM TREATMENT OF CANCER OF THE TONGUE*

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RADIUM treatment of cancer of the tongue has made rapid strides in the past few years, following the results obtained by Regaud, who introduced the method of needling now in most general use. A period of exaggerated enthusiasm followed, and, unless a period of unjustifiable pessimism is to come, it is essential from time to time to review the position of this relatively new method.

SELECTION OF CASES

The time for comparing and contrasting radium with surgery has passed, so far as the immediate results are concerned, and the possibilities of radium are now universally recognized; but a comparison of end-results is more difficult to assess accurately because operability is of far greater importance in excisional treatment than it is in radiotherapy. Radium as a method of treatment is applicable in cases totally unsuitable for excision and, in the study of the list of cases to follow, no attempt is made to separate the operable from the inoperable group; stress is however, laid upon the glandular condition. All cases were treated with the exception of those actually not expected to survive more than a few weeks. The chief object in view was to alleviate the patient's condition, even if nothing more than palliation was anticipated. The selection of cases makes a vast difference in the percentage of final results, but we were less concerned with the brilliancy of eventual statistical tables than with the attempt to treat all cancerous patients seeking advice; and in this way from time to time an entirely unexpected result was obtained which was nothing short of a miracle. This was perhaps, a factor mercifully provided by chance in an otherwise dismal procession of patients, the majority of whom were rejects from other institutions and were well beyond the range of even the most courageous of surgeons.

* Read at the Section of Surgery of the British and Canadian Medical Associations' combined meeting at Winnipeg, on August 28, 1930.

All the cases were treated by implantation of radium needles into and around the tumour, seeds being used exceptionally when local conditions demanded it. The needles used contained 0.6 mg. and 1.3 mg. of radium, and were fully screened by 0.5 mm. and 0.6 mm. of platinum respectively. The period of treatment was seven days. The amount of radium used depended upon the extent of the disease. Treatment of the primary lesion was nearly always followed by treatment of the lymphatic area in the neck. Only in the first two years was this occasionally omitted, generally in cases where nothing abnormal was palpable. This policy proved disastrous and was soon abandoned in favour of systematic treatment of the lymphatic areas in all cases.

Analysis of Results

The statistical tables submitted are based upon a total of all my own cases treated at Westminster Hospital, in private and elsewhere, and upon the cases treated by my colleagues at Westminster Hospital. They cover the period of five years from April, 1925, to April, 1930. There is no selection of cases; the few not submitted to treatment are not included in the tables. Those that could not be traced are considered as having died three months after their last visit to the hospital. The remainder of the cases have been traced and seen, or their doctors communicated with. A suspicious induration is considered as a local recurrence, unless excised and proved to be non-malignant on histological section.

Oral cancer.—The total number of cases of oral cancer treated is 253, distributed as shown in Table I.

TABLE I.—*Total Cases of Oral Cancer*

Tongue	169	Palate	28
Cheek (buccal mucosa)	23	Lip	21
Tonsil	12		

Lingual cancer.—The total number of cases of lingual cancer is 169, distributed as in Table II.

TABLE II.—*April, 1925, to April, 1930: Five Years*

Carcinoma of tongue	Total	Disappearance of primary growth	Local recurrence
Anterior	20	15	7
Antero-lateral	79	65	21
Postero-lateral	14	9	2
Inferior	33	25	9
Posterior	23	12	4
	169	126	43

This table shows that disappearance of the primary lesion was obtained in 126 cases—that is, 74 per cent. The number of local recurrences, as distinct from primary failures, is 43 (25 per cent); this group includes cases where the lesion reappeared, although by subsequent treatment the disease may have been completely eradicated. The percentage of cases requiring a second treatment was definitely greater in the group treated by radon seeds than in those treated by needles. In some cases local recurrences were obviously due to under-dosage and, as experience increased, this group of cases became smaller. The local recurrences must be carefully distinguished from ulceration at the site previously occupied by the primary growth, which may be due to sepsis, excessive irradiation, and a delayed radium reaction specially in areas involving the mucosa covering the gum, where an underlying necrosis of the bone may not become evident till a few months later. The percentage of local recurrences can be minimized by removing with the diathermy needle all suspicious indurations, residual nodules of thickened tissue, although these may only be due to fibrosis. The local condition of the area previously occupied by the neoplasm must be soft, resilient, and covered with intact mucous membrane. With adequate screenage, suitable dosage, uniform distribution of the needles, strict aseptic precautions, and preliminary oral hygiene, including the removal of teeth, this can be achieved in the majority of cases.

Survival-rate

Table III shows the survival-rate in the cases treated in each year. It shows only two cases alive out of a total of 18 cases treated in 1925. But this list must be studied in conjunction with Table IV, which shows that of the 18 cases 13 had palpable glands, and in seven of these the glands were surgically irremovable; this leaves five cases with no palpable glands, of which two are alive at the end of five years. It has already been stated that in the early days the treatment of the neck received only scanty attention, so

TABLE III.—*Survival-rate.*

Year	Total cases	Alive to-day and percentage	Years of survival
1925	18	2 (11)	5
1926	16	3 (18.7)	4
1927	23	6 (26.5)	3
1928	33	16 (48.4)	2
1929	47	30 (63.8)	1
1930	32	16 (50)	Less than one
Total	169	73 (47.9)	—

that, although these five cases were early, some of them had no treatment to the lymphatic area till it was too late and eventually died from metastasis.

Table IV. shows the number of cases treated in each year, those with lymphatic involvement and those where the glands were inoperable. The percentage of survival for less than one year in 1930 is 50 per cent—that is, less than the one-year survival for 1929, and can be explained by a marked increase in hopeless cases treated as more accommodation for patients was provided.

TABLE IV.—*Glandular Involvement and Rate of Survival*

Year	Total cases	Glands		Survival in years			
		Involved	Inoperable	Five and four	Three	Two	One or less
1925	18	13	7	2	3	1	2
1926	16	14	9	3	4	2	7
1927	23	22	11	..	6	5	12
1928	33	24	15	..	..	16	17
1929	47	33	23	..	..	..	30
1930	32	24	18	..	..	..	16
Total	169	130	83	5	13	24	84

SOME POINTS OF IMPORTANCE

The experience gained by the treatment and the study of after-results of these 253 cases has led to a better understanding of the disease, to some improvements in the methods of treatment, and to a more thorough attack on the glandular area. The lessons learned are summarized below.

(*a*) Needles are preferred to seeds as more accurate distribution is possible and there is less likelihood of leaving non-irradiated areas and so possible sites for future recurrences.

(*b*) The impression that results are more permanent with radium salt than with emanation is based upon actual cases, and is possibly due to the uniform intensity being maintained through the whole period of treatment with the former.

(*c*) Screenage by 0.6 mm. of platinum is preferred as this allows the treatment to be continued for seven to ten days without marked risk of necrosis.

(*d*) Re-needling of the tongue at the end of the first week is practised in extensive lesions and is preferred to larger dosage left in for seven days only.

(*e*) Cases of posterior carcinoma can be needled by open operation through a pharyngotomy with great accuracy and good result. Peroral needling is less accurate and should be reserved for the more sensitive type of tumour (the transitional-celled carcinoma of Quick or lymphocarcinoma of Regaud).

(*a*) Lead protection of the roof of the mouth is practised in every case where the amount of radium in the tongue exceeds 6 mg. (10 needles of 0.6 mg. or its equivalent). The protection is not always necessary, but is a safeguard against radium burns of the palate which have occurred in non-protected cases.

(*b*) Lead protection of the floor of the mouth is not used as a routine, but only in cases where the disease is entirely localized to the tongue and does not involve the floor of the mouth.

(*c*) Plates made of stent or vulcanite or composition are used to help to retain the needles in the floor of the mouth. These plates do not contain lead.

(*d*) Surface application to the tongue is not practised. In cases too advanced for needling, seeds are used and glossectomy by the diathermy is considered.

TREATMENT OF THE CERVICAL AREA

No neck should be left untreated, even if no glands are palpable, and the lesion in the tongue is small, the gravity of possible extension to glands is such that treatment cannot be omitted. In certain histological types and in patients under 50 years of age the prognosis entirely depends upon the early and vigorous treatment of the neck. The policy at present advocated is to divide the cases into three groups—namely: (1) unpalpable glands, (2) palpable glands, and (3) inoperable glands. The treatment differs in each group.

The first group is suitable for needling of the neck by the "Closed method." The distribution of the needles must be accurate, extending from the mastoid process to the clavicle and providing efficient irradiation in the submental, submaxillary, anterior, and posterior triangles of the neck. With a little experience the needles can be placed in position without an operation for access. As an alternative to this method a radium collar can be employed, but as the treatment is entirely a prophylactic measure, a two-stage irradiation is not indicated. Needling is, as a rule, preferred by the patient, as it is somewhat less irksome than surface application.

When the glands are palpable, but small, mobile and absolutely operable, the choice of treatment lies between operative removal and "open needling" after providing access to the glandular area by surgical means. Surgical

removal of the glands is only indicated if the following conditions obtain:—

(1) The primary lesion must have entirely disappeared.

(2) The glands must be absolutely operable.

(3) The general health of the patient must be good.

If the operation for the removal of the glands is undertaken, it must be a complete and wide excision. Half measures have no place in the treatment of the cancerous neck; an incomplete operation leaves the patient in a worse plight than before the treatment and must never be done, as irradiation offers so much more. The operation is variously known as Butlin's, Crile's, or "block" dissection, and is sufficiently well known not to require a description here.

The insertion of radium in the neck at the end of the operation is not advisable, and irradiation is much more efficiently carried out as a second stage by means of a columbia paste collar after the wound is healed.

If the surgical removal of glands is not undertaken the neck is needled by the "open method." Insertion of needles blindly into the neck in cases where the glands are palpable, but early and discrete, is not advisable; more freedom and, hence, greater accuracy is obtained by incising the neck along the sterno-mastoid, exposing both its anterior and posterior borders, dividing the common facial vein at a short distance from the internal jugular, and placing the needles in position under vision in close proximity to the enlarged glands; the submaxillary and submental areas are also needled.

When the glands are matted together and a fixed mass is present in the neck (inoperable cases), palliation only is aimed at. This is obtained by needling the mass and the surrounding tissues with a relatively large quantity of radium; the technique of needling in this case differs from that in the group dealing with palpable glands. The mass is literally filled with radium; seeds can be used here, and screenage is of lesser importance as the mass of tissue itself acts as a protection. This gives remarkable results at times. The interstitial method is followed two or three weeks later by surface application to the whole neck. The future will show if distance applications with the "bomb" will give better results than the methods here described.

RADIUM AND SURGERY IN CANCER OF THE TONGUE*

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CANCER of the tongue embraces one of the largest groups of epidermoid carcinoma. For the purpose of discussing this common form of tumour process it may well be taken as illustrative of practically all types.

Anatomically, growths of the tongue range from the most superficial papillary out-growing processes to the deeply infiltrating neoplasm with little by way of surface manifestation to call attention to it before it is entirely out of bounds. Depending upon the location, they may be most accessible or they may be practically impossible of technical approach. When cancer is superimposed upon chronic inflammatory processes, notably leukoplakia, luetic glossitis, or both, the anatomical changes may be such as to alter the normal course and type of growth and to present added complications from the therapeutic standpoint as well.

Practically every histological type of epidermoid carcinoma is encountered in the tongue, from the papillary squamous cell growth to the invasive infiltrating tumour of like cellular structure, and from the fully differentiated adult type to the totally anaplastic transitional cell structure. Tongue cancer is influenced by all of the various factors of dental and oral hygiene. The chronic irritation of irregular teeth or dentures is a well recognized contributory cause in the development of lingual growths. The bacterial flora of the ill-kept mouth exerts a profound

* A contribution to the discussion on "The uses of radium in surgery" held in the Section of Surgery, combined meeting of the British and Canadian Medical Associations, Winnipeg, August 28, 1930.

influence on the otherwise normal course of a growth, if, indeed, it does not actually contribute toward its development.

It is the consensus that tongue cancer affords an average cross-section of therapeutic results in comparison with intra-oral cancer in general. It is the purpose of this communication to emphasize, particularly, two points: (1) The combined use of radiation and operative surgery offers several advantages in the treatment of epidermoid carcinoma in general. (2) The treatment of epidermoid carcinoma is steadily approaching a more reasonable, accurate and efficient basis.

At this stage in the development of radiation therapy it is but natural to expect that many conservative surgeons, and some skeptics, will have none of it. At the other end of the scale are the extreme radiation therapists, eager to cure all cancer by irradiation. Radiation therapy has established a place for itself beyond question. Nevertheless, it has never been considered the ideal specific cure for all cancer. The surgical efforts toward the relief of cancer have fallen short, yet they have not been futile by any means. It is unfortunate that more attention has not been directed toward combining the best from each method for the ultimate good of the cancer sufferer.

Histological study of the relative degrees of cellular differentiation or potential malignancy of tumour processes has been most enlightening from the therapeutic standpoint. It shows very clearly the chief reason for surgical failure in many instances and at the same time explains some of the most spectacular reactions to irradiation. The undifferentiated growth, highly malignant, prone to early and widespread dissemination through both lymphatics and blood stream, presents obviously a poor surgical risk. On the other hand it is highly radiosensitive. The fully differentiated tumour process is more orderly in its development. Metastasis occurs, as a rule, later in the course of the disease and even then tends to remain within a limited area. In such cases it is but reasonable to expect relatively better results from operative measures. The more adult the growth the more radioresistant it becomes. The reaction to irradiation is not nearly so spectacular, and yet, if the process be controlled by this means the assurance of permanency of the result is much greater.

The application of these observations on relative radiosensitivity based on the degree of cellular differentiation of the tumour process is of tremendous practical importance. It not only aids in determining the treatment method of choice but, if that method be irradiation, it serves as a guide to the necessary intensity of dosage.

The work of Martin and Quimby, at the Memorial Hospital, on the estimation of relative dosage intensities for different types of epidermoid carcinoma gives a practical basis for dosage estimations. They have shown that adult epidermoid carcinoma requires from seven to ten skin erythema doses throughout the tumour-bearing area to produce complete and permanent control of growth. The anaplastic growths, on the other hand, respond completely to a dosage range of three, or slightly under, to five or six skin erythemas depending upon the relative degree of differentiation.

The dosage intensity judged necessary in a given case governs, in turn, the technical methods employed to provide that dosage. The most that can be delivered by *external radiation*—radium, x-rays, or both—to the midline of the oral cavity within a treatment interval of two to four weeks and consistent with the safety of the patient, is two and one-half to three skin erythema doses. External radiation, therefore, is capable of causing complete regression of only the most radiosensitive growths of the tongue. Growths showing any degree of cellular differentiation must have their irradiation intensity increased by some means, in addition to the maximum of external irradiation. Interstitial irradiation must be employed. Epidermoid carcinoma lends itself more readily to histological "grading" than some other types of malignant processes. The distinctions are more clear-cut and better defined. This, together with the fact that the initial dosage intensity studies were carried out in the same group places epidermoid cancer therapy in the forefront, from the standpoint of accuracy at least.

The problem of tongue cancer which was regarded a few years ago as very fully understood, clinically and pathologically, and de-

pendent for cure on improved technical operative measures, now stands in an entirely different light. The relative radiosensitivity is the guide to selection of the treatment procedures, as well as to the prognosis. Irradiation is assuming a degree of accuracy and exactness comparable to a nicely adjusted surgical procedure rather than following on in the empiric channels of the earlier radiation therapy.

In short, the treatment of tongue cancer is not a matter of following a standard technical procedure adopted as a group problem. It is a special problem in each individual case, a problem following certain broad principles, but in detail guided by the steadily increasing fund of new information now coming to us.

Inasmuch as treatment detail is based largely on the histology of the growth it is essential that a biopsy be done early and in all cases. The theoretical objections to this procedure are over-ridden by the advantages of the information obtained. If done with care, the trauma is negligible. A small piece of tissue, a few millimetres in diameter, if carefully selected and removed without tearing or crushing, is sufficient. A clinically cured case is of no value except to the one who has treated it, unless substantiated by a positive section. The Wassermann reaction is of interest and of some practical value. Cancer, in the presence of a positive blood complement fixation, reacts better if moderate anti-luetic treatment is employed. All too frequently, however, the matter of diagnosis is closed with the positive Wassermann and cancer ignored until it is beyond control. Altogether, the Wassermann reaction has been more of a curse than a benefit to cancer therapy.

Before any aggressive treatment is undertaken in tongue cancer, rigid oral hygienic measures should be instituted. Local sepsis not only depletes the patient's general condition and contributes to local necrosis, but it nullifies to a great extent the normal reaction to irradiation. In fact, radiation in the presence of any marked degree of local mixed infection is of questionable value. Infected and jagged teeth should be removed, unless encroached upon very closely by active tumour tissue. Cleansing measures should be aggressive and efficient but irritating solutions should be carefully avoided.

The last published report on tongue cancer from the Head and Neck Department of Memorial Hospital was presented before the First International Congress of Radiology in London, 1925, and published in the *British Journal of Radiology*, March, 1926. Since that time we have adhered to the same principle of treatment as outlined in that report, with the various improvements incident to further experience, additional technical facility, and more efficient equipment.

Radium emanation, or radon, in gold capillary seeds, with a filtration of 0.3 mm. gold, has been used for interstitial implantation since early in 1925. External irradiation of greater intensity than formerly employed is being used as a routine in all cases. For the past three and one-half years our equipment for external irradiation has been augmented by a four-gram radium element pack. The combination of treatment measures is coming more and more to be guided by the histological interpretation of the tumour. Dosage intensity is better understood and has been made applicable, practically, to the routine work. The indications for neck dissection are gradually being limited so that dissection is restricted to a relatively smaller group of cases. Most gratifying of all is the steady increase in co-operation and contact between pathologist, physicist, and clinician. The complexities of the problem demand the concerted efforts of a group of workers.

In the treatment of cancer of the tongue we depend upon irradiation entirely for direct complete control—or growth restraint only if palliation is aimed at—of tumour tissue under all circumstances, except, in the operable metastatic cervical nodes of fully differentiated carcinoma. In these, removal by complete surgical dissection is further restricted if the primary growth is not controlled or if the metastatic involvement is bilateral.

All cases accepted for treatment receive, as an initial procedure, external irradiation of maximum intensity during the first two weeks. This is directed through both sides of the neck and includes within the field of irradiation the site of primary growth as well. Immediately following this, gold seeds of radon—individual

value about 2 mcs. each—are inserted into the base of and round about the primary growth. The dose is determined on the basis of radiosensitivity of the growth and the established dosage-intensity experience previously referred to. It is regarded as safer to withhold the implantation until the external irradiation has been completed, or nearly so. The growth is smaller and better defined.

Necrosis of tissue rarely occurs except in the presence of uncontrolled local infection. If the growth be bulky, fungating, and markedly infected, the implantation of radon is followed in a few days by cautery removal of the condemned area. By utilizing the tumour as a radium holder, the entire tumour bed is heavily and uniformly radiated. It is, therefore, a safer subsequent operative field. By increasing the total strength of implanted radon to compensate for the subsequent sacrifice of the unused portion, the surgical removal may be done before all of the emanation is exhausted. It is sometimes simpler to do it this way before the anatomical limits have been obscured by radium inflammation. The area removed is only that which might otherwise break down. It is not extended to a wide surgical removal, since responsibility for direct control of growth has been placed with the radium. The removal is to promote surgical cleanliness only. Pain is thus relieved, more rapid healing encouraged, and a minimum of deformity produced.

Secondary invasion of bone by growth, infection in bone, or devitalized bone caused by irradiation, calls for surgical removal. At times the after-care of tumours at the base of the tongue may be facilitated by removal of a segment adjacent to the lower pole of the tonsil, and, of course, after the irradiation has been completed.

New growths at the base of the tongue are deserving of special mention. The hopelessness of dealing with these surgically has always been considered due to technical difficulties. Study of their histology would indicate that it has been due largely to their lack of differentiation. Practically all of the anaplastic tongue growths have their origin in or closely associated with the area of the lingual tonsil. The transitional cell carcinoma was first recognized from this location. Like all growths arising in intimate association with the lymphoid tissue of the pharyngeal ring, they exhibit a degree of radiosensitivity almost out of keeping even with their degree of histological cellular differentiation. This explains the occasional complete regression of what has always been regarded as a particularly hopeless type of growth under the influence of external irradiation only. The relative curability of lingual cancer in the other locations—tip, dorsum, and lateral border—is very largely dependent on the anatomical character of the growth together with the ease or difficulty of technical access.

Carcinoma developing in a tongue which is the seat of a generalized luetic glossitis, follows a course clinically different from the same histological type under normal conditions of tumour bed. The rate of growth is slow; it is particularly radio-resistant; the tendency is toward multiple lesions probably because the site predisposes to malignant involvement. Because of the limited blood supply and the increased fibrosis the tendency is strongly toward secondary necrosis under heavy irradiation. It frequently calls for a limited surgical removal following interstitial irradiation. When it becomes necessary to remove tissue from the tongue, as just outlined, an ordinary electrothermic cautery, heavily constructed so that it will maintain a uniform degree of heat without intermittent cooling, and with a flat blade which permits of excising the condemned area of tissue rather than simply burning it out, is employed.

We have gone through the experiences with the various equipments for coagulation of tissues by means of currents of a high rate of oscillation. These procedures take their place in the cautery field, and whether they or the old-fashioned cautery methods are employed is a matter of personal preference. The very admirable article by Mr. W. Douglas Harmer[5] on the use of the high-frequency cautery in the April, 1928, number of the *British Journal of Surgery*, is a most reasonable presentation of this method. It is doubtful, however, if it quite fulfils all that can be accomplished at present in the treatment of mouth cancer and it is possible that the psychological appeal of such equipment, in some quarters at least, may obscure certain

fundamental principles of cancer therapy which to-day are fairly well recognized.

TREATMENT OF THE NECK

The treatment of metastasis in the cervical lymph-nodes is probably of greater importance than that of the primary growth. Our method of dealing with the neck is based on the premise that the cervical lymph nodes perform a conservative function, up to a certain point at least. The protective reactions within the lymph nodes, as observed histologically, are well known and further observations on radiated normal lymph nodes strongly suggest that this reaction is amplified under the stimulus of radiation. Whatever may be said of the various glandular types of cancer, it is fairly well established that metastatic extension of epidermoid carcinoma is by embolism.

When a metastatic deposit makes itself evident it is usually in one lymph node only, or at most, confined to one or two adjacent nodes. Widespread involvement with multiple nodes involved rarely occurs until very late in the course of the disease. We believe that in the early stages, with a single palpably enlarged node, the capsule of which is intact, the disease can be dealt with quite as efficiently as is possible by doing a dissection before the node becomes palpable. In other words, routine block dissection of the neck is not practised.

All necks are treated by means of heavily filtered external radiation of maximum intensity consistent with tissue tolerance, and from both sides, as previously mentioned in discussing the primary lesion. For economic reasons heavily filtered high voltage x-radiation is used as a routine measure. By preference heavily filtered radium would be used. Clinical observations suggest that radium is preferable to x-radiation. It is only since having at our disposal a four-gram radium element pack, however, that it has been possible to carry out this type of radium radiation with maximum efficiency, and that only in the more favourable cases. Unless the actual quantity of radium utilized in this manner is equivalent to the quantity of x-radiation, then it is preferable to use x-radiation. A good dose of x-ray is always better than a poor dose of radium.

For some time clinical observations seemed to indicate that x-radiation and heavily filtered radium could be combined for the neck radiation to advantage in two ways. It was noted that the total quantity of radiation which the skin would tolerate was greater by combining the two than if a comparable quantity of either agent alone were used. The reaction within the tumour bearing area as observed clinically was superior. Observations by Dr. Ewing on histological preparations of tissues so radiated have led him to conclude that the effect of x-radiation is more pronounced on the connective tissue element, while radium is more effective on the cellular structure.

Experiments by Quimby and Pack in the Memorial Hospital bio-physical laboratories have confirmed the clinical observations on the skin tolerance. There is a difference, dependent apparently on the differences in wave-length, which permits of increasing the total quantity of radiation by combining the two ranges of wave-length. Patients presenting no palpably enlarged metastatic nodes on admission for treatment are subjected to heavy external radiation and kept under routine observation. If a palpable node of adult type epidermoid carcinoma is present, complete unilateral neck dissection is done under local anæsthesia. All the lymph-node-bearing areas from the chin to the collarbone and including the submaxillary salivary gland, the jugular vein and the sterno-mastoid muscle, are removed through a modified Bastianelli incision. Before the wound is closed, filtered radon seeds are implanted at any suspicious points within the wound, particularly where the lymphatic paths are severed. This does not interfere appreciably with the healing of the wound. No post-operative irradiation is employed.

If the metastatic lymph node be inoperable, no attempt is made toward local removal or complete dissection. The surgical exposure is utilized to implant filtered radon seeds throughout the tumour-bearing area and the wound is then closed. This procedure, with a minimum of trauma to the blood supply of the local area, is preferred to a partial removal plus radium for the remainder. Any node in which the disease has perforated the capsule is regarded as being inoperable, even though it may be small, and from the standpoint of technique, removable in the gross together with the ad-

jacent structures. All necks with bilateral metastatic nodes are regarded as being surgically inoperable, even though the metastases may be quite readily removable technically. Once the disease has involved both sides of the neck it is considered as incurable by any means, except in very rare instances. For the very advanced metastatic nodes external radiation only, as a palliative measure, is used.

Complete and permanent regression of fully differentiated squamous cell carcinoma, secondary in the nodes, has not been observed from external radiation alone. Metastatic nodes from anaplastic epidermoid carcinoma, even though coming within the definition of an operable node, are treated by radium alone. Usually, filtered radon tubes are implanted as well, just as in the treatment of the primary growth in this group, but the backbone of treatment in this type of lesion is external radiation and no resort is made to operative surgery for removal. The routine external radiation to the neck is done within a period of a fortnight.

Unfortunately, from the standpoint of statistics, we continue to treat practically all cases applying at the clinic. There is no selection except to decline acceptance of those equal to nursing care only. From a humane standpoint it has been necessary to do this, and, on the other hand, it has always been the feeling that observation of all stages of the disease is of value. Such a policy, however, precludes a satisfactory comparison of statistics with radiological clinics where selection is practised or with surgical clinics where none but operative methods are employed.

Our report on tongue cancer made at the Second International Congress of Radiology in Stockholm, July, 1928, covered a group of 473 histologically verified, and clinically *unselected* cases treated during the eleven year period from January 1, 1917, to December 31, 1927. The survivors in this group have been re-checked to December 31, 1929.

The percentages of freedom from clinical evidence of disease are as follows:

	Percentage	*Cases*
Tip of tongue	40	6
Dorsum of tongue	17	10
Lateral border of tongue	19	54
Base of tongue	11	13
Recurrent	17	4

Of the total group, 97, or 20 plus %, are alive and in the active service. Of these, 87, or 18 plus%, present no clinical evidence of disease.

The intervals of freedom from disease are as follows: 39 cases, 5 to 12 years; 24 cases, 3 to 5 years; 24 cases, 2 to 3 years.

Of the entire group, 69 plus per cent are known to be dead. A number of these died of intercurrent disease and while free from clinical evidence of cancer: 19 cases lived 5 years or over; 19 cases lived 3 to 5 years or over; 113 cases lived 1 to 3 years or over; 179 cases died within one year.

In the group showing no evidence of metastatic involvement of nodes throughout—189 cases—66 are now no evidence of disease. The group of 161 cases with gross evidence of lymph node involvement on admission shows only 6 no evidence of disease cases now; and of the 103 cases developing nodes after admission, 12 only are now no evidence of disease.

It is true that all of these cases did not die as a result of the metastatic involvement. Many were far advanced in the primary site. In many others the node involvement was hopelessly advanced. The group does not include an appreciable number of our gold tube radon implantation cases. The failure to control these cases with metastatic cervical nodes, however, leaves much to be desired in the treatment of the neck.

In the entire group of 473 cases, the percentages of surgical operability on admission were as follows:

	Percentage
Tip of tongue	60
Dorsum of tongue	25
Lateral border of tongue	46
Base of tongue	9

The percentage of freedom from clinical evidence of disease in the entire group of unselected cases—18 plus per cent—is regarded as comparing favourably with the average of operative surgical statistics in the group of operable cases alone.

SUMMARY

1. At the Memorial Hospital, radium is the agent of choice for treatment of the primary growth in cancer of the tongue.

2. X-radiation is a necessary complement to the treatment of all cases of lingual cancer, unless replaced by the use of very large

amounts of radon for external application.

3. Radium must not be depended upon entirely, and in all cases, to the exclusion of other associated measures.

4. Operative surgery is indicated in the mouth for access, drainage, and in dealing with disease in bone.

5. Operative surgery is indicated in the neck in early definite involvement of adult epidermoid carcinoma, in addition to irradiation.

6. Surgical exposure in the neck, plus filtered radium implantation, is indicated in a variety of metastatic conditions other than the group operable by complete dissection.

7. The selection of technical methods and the guide to irradiation intensity is through an appraisal of the relative radiosensitivity of the growth as judged by the degree of cellular histological differentiation.

8. The irradiation must be directed with care and precision. The minimum intensity must conform to well defined standards.

9. The best interests of the patient are served through close co-operation between pathologist, physicist, and clinician.

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THE PRINCIPLES OF AND SOME RESULTS IN THE RADIUM TREATMENT OF BUCCAL CARCINOMA

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REVOLUTIONS in medicine and surgery, as in anything that matters, are rarely successful, but it would appear that the treatment of carcinoma of the mouth and tongue is an exception to the general rule, and that it is extremely improbable that we shall ever revert to the older forms of treatment, at any rate for the primary growth. This surgical revolution is, however, more apparent than real and takes no account of the painstaking work of the last two decades in radium therapy. It was Dominici—whose death was probably due to excessive exposure to the gamma ray—who drew attention to the importance of filtration in eliminating the direct action of the beta ray and so utilizing the selective action of the gamma ray. Later Regaud showed that the prolonged action of the gamma ray in relatively weak intensities produced, in the squamous epitheliomata at any rate, a more favourable response than did a high intensity for a short time.

During the War, small, unscreened glass emanation tubes, 5—10 millimetres in length, and containing 1—2 millicuries of emanation were used extensively in buccal carcinoma, in America. These were buried and left permanently in the tissues. A very intense local reaction resulted owing to the unrestricted action of the beta rays, but in such patients as survived the ordeal with its distressing and painful complications the results were good. It is important to realize that this method embodied the principle of prolonged irradiation, of which Regaud is an advocate. Later, Failla, at the Memorial Hospital, New York, used gold seeds, 0.3 millimetres in wall thickness, filled with emanation, which cut off about 50 per cent of the beta rays, whilst still later Muir invented the removable platinum radon seed. In Manchester we had used the unscreened seed and, on analysing our cases, when I took over the work from Dr. Arthur Burrows in 1925, it was found that 80 per cent of our successes with the primary growth had followed this method of treatment. As a result, we began to employ the same method of treatment as Regaud for the primary growth, screening our source with a minimum of 0.5 millimetres of platinum, and using as great an active length as possible.

Radium has improved out of all recognition the outlook in buccal carcinoma, and it has, I think, at the same time enriched our knowledge of the disease. The original surgical conception of the disease required the removal of the primary

growth, the lymphatic tract to the lymph nodes and the nodes themselves en bloc. The operation thus resembled in conception and execution the radical amputation of the breast as it is still performed, but with a much higher mortality. However, even before radium was seriously considered as a factor in treatment, it was realized that cases could be cured by the ablation on separate occasions of the primary growth and the lymph nodes, and radium treatment has conclusively proved that, in buccal carcinoma, metastasis to the lymphatic glands is by embolism.

But radium has done more than this, for the coincident investigations of the histological structure of buccal carcinoma in different parts of the mouth have shown that quite well marked variations occur with corresponding variation in sensitivity. We know now that almost every carcinoma of the base of the tongue will be of an embryonic, undifferentiated and radio-sensitive type; that consequently there is a good chance of local cure in almost every case, and that the danger lies in the rapid and widespread metastasis. The only cases I have seen of pulmonary metastases in buccal carcinoma have been of this type. We know that epithelioma of the cheek, lip, floor of the mouth and anterior third of the tongue are almost invariably of a highly differentiated type, with abundant cell nests. They are radio-sensitive, but less markedly so than the preceding type. Our own observations indicate that practically every case which arises on the anterior third of the dorsum is superimposed upon a chronic glossitis of syphilitic origin. This interferes with the response to irradiation, and, occasionally, even small lesions do not respond. In such cases it is always advisable to point out that diathermy may have to be used later if radium is unsuccessful. Such cases strengthen the evidence that tissue reaction is an important factor in the effect of radium upon malignant tumours. In the middle third of the tongue, on the tonsil and fauces and soft palate, both histological types and also intermediate varieties are found.

It would seem from the above considerations that all squamous epitheliomata of the mouth and tongue are radio-sensitive, some more so than others, and that there is now unanimity of opinion that prolonged irradiation with gamma rays of low intensity yields the best results. The problem then should be mainly one of the insertion or application of the radium.

SEEDS OR NEEDLES

It has always seemed to me that it is infinitely easier to insert a needle of active length, say, 30 m.m., than six separate seeds of active length 5 m.m., and this becomes the more evident the larger the growth. This is a general opinion in England, where we use needles of active length up to 50 m.m. for the treatment of breast carcinoma. I would unhesitatingly say that needles are superior to seeds. There occur certain occasional complications from radium treatment which certainly do not follow operative methods, involving necrosis of bone or of the soft tissues. If a lesion is involving bone superficially necrosis is almost inevitable if the disease is to be eradicated, and may be prolonged and distressing. If bone is extensively involved, it is doubtful whether the disease will ever be eradicated by radium alone, and in such cases radium treatment to the soft parts combined with surgical excision of the affected bone, if possible, is the better procedure. No matter how careful and experienced be the operator, necrosis of the soft tissues sometimes follows. Overtreatment, rather than undertreatment, should always be our aim, since second applications do not meet with so active a response as the first, except after a long interval of time, when it is probably too late.

In the preceding remarks it has been assumed that the primary growth is treated first. The primary growth must be regarded as a source of embolic infection of the glands, and clinically we know that if the lymphatic flow is blocked by extirpation of the glands on one side of the neck it is diverted to the opposite side. I have, personally, seen several cases which demonstrate this. Radium treatment is a conservative method in which, if successful, function is restored almost to normal, and little need be said as to its advantages over that of the surgery of the tongue. In the cheek, palate, and floor of the mouth, little can be seen except slight scarring; in the tongue the same may be said, although slight deviation to the affected side with pointing of the tip to the opposite side is noted in lesions of the middle third. Speaking, eating and drinking suffer no impairment. Reference will be made to published results later. Local recurrence is rare after six months and cases of so-called "recurrence" are those in which the growth has never really disappeared.

THE LYMPHATIC DRAINAGE AREA

Although most workers are agreed as to the principles of treatment of the primary growth by radium, there is no method of using radium alone which has established itself as the method of choice in the treatment of the lymphatic drainage area. Even with a primary growth confined to one side of the mouth we have to consider the treatment of a wide area bounded in practice by the limits of the anterior and posterior triangles of the neck, although theoretically and occasionally in practice metastasis occurs in the opposite anterior triangle. Needling is a localized method of treatment and if in the primary growth, which is relatively circumscribed, we are compelled to insert some fifteen needles, we ought to implant at least thirty to forty in the much wider secondary area. In the majority of cases of buccal carcinoma the upper deep cervical and later the lower deep cervical groups of glands are invaded, and some of these lie posteriorly to the internal jugular vein. Such cannot possibly be dealt with adequately by the insertion of radium needles blindly through the skin, and a thorough exposure of the neck is necessary. Similarly, in order to deal effectively with the glands in the posterior triangle and supraclavicular fossa, the sterno-mastoid muscle should be divided and reflected upwards. I feel, therefore, that, if all this is necessary for adequate treatment by the implantation of needles, a block dissection might as well be done at the same time, in an operable case. With an experienced operator and a regular assistant, the operation is not so formidable as it appears, and I am convinced that it is one of the best surgical operations in malignant disease. The tragedy is that so many block dissections are so only in name.

In an operable case the choice rests between the implantation of needles and some form of external irradiation. It is very doubtful whether external irradiation, except in the case of the radio-sensitive types which are found at the base of the tongue, has ever cured a case with fixed secondary deposits in the neck. Our practice in Manchester is to reflect flaps, as in the case of a block dissection of the neck, and divide the sterno-mastoid. Needles are then inserted in the anterior and posterior triangles about 2 c.m. apart. They vary according to circumstances in active length between 20 and 50 m.m., and are left in position about eight days. Usually 30—40 needles are required, and the wound has to be re-opened under a general anæsthetic for their removal. One should never subordinate the position and direction of the needles to ease of removal.

There is, in my experience, justification for the adoption of a policy of observation if no glands are palpable, provided the patients are seen at least once a month. If means had permitted, these patients would have been subjected to external irradiation by about half a gramme of radium at four to seven centimetres distance. At the Fondation Curie a routine block dissection is performed, followed by distance irradiation if microscopical deposits are found in the glands removed. Summarized, our own position is:—

1. If no glands are palpable, observation at monthly intervals.

2. If glands are palpable and removable, block dissection, either combined with implantation of radium or followed by external distance irradiation.

3. If the glands are fixed, implantation of a large number of needles 30—40, after thorough exposure of the neck.

THE RESULTS OF TREATMENT

There are very few figures available for the results of treatment by radium alone.

Berven, of Stockholm, published in 1928 the results in 22 patients of whom 13 were alive five years later (59 per cent). These, however, were "operable" cases and radium was not the only factor concerned. His practice is to use diathermy, either for excision or coagulation, and to supplement this with the implantation of radium for twenty-four hours. I do not think that these results should be included or compared with those obtained by radium alone. Any surgeon of experience will recognize that it is impossible to deal adequately by diathermy with any growth of the tongue which involves extensively the middle or posterior thirds. We all recognize that surgery can achieve good results with early growths of the anterior third of the tongue, but having seen what radium can accomplish at all stages of the disease by the technique first advocated by Regaud, with no mutilation and a complete restoration of function, we feel that it has established itself as the method of choice in the first instance.

Regaud's last published results were assessed in December, 1927, and I have abstracted and summarized them in the following table:—

	1922	*1923*	*1924*	*1925*	*1926*
Total.....	33	54	55	60	54
Complete cure	6	10	11	17	21
Percentage...	18.18	18.50	20.00	28.33	38.88

This table, therefore, gives results at 1, 2, 3, 4, and 5 years respectively. It will be observed that if a patient survives for three years he has an almost equal chance of living for two more years.

The methods we employ in Manchester, which are based on those of Regaud, were begun late in 1925 and so far the results have been reviewed only on a three years' basis. They are as follows:—

	1926	*1927*	*1928*
Total.....	80	74	113
Complete cure.....	18	25	51
Percentage.....	22.50	34.7	45.13

For the same periods of time they are approximately the same as Regaud's, but there are several points to which I should like to draw attention. It has been our custom at the Manchester and District Radium Institute to issue an annual report, and this is in effect an annual process of examination. Although we cannot claim as cures patients treated so recently as three months previously, yet by comparison with the same results year by year, we discover whether our immediate results are on the up grade. For the primary site in buccal carcinoma our percentages of "apparent cures" for 1926, 1927 and 1928 were 38.7, 47.3 and 60.00 respectively, and, where the primary and secondary sites were considered 27.5, 36, and 45 per cent respectively. In other words, our immediate results improved each year. Naturally, this percentage became lower when the results were reviewed at a later date, although we do not find that recurrences at the primary site are common. I think that this improvement is chiefly due to increased personal experience, and that it is an argument for the treatment of carcinoma of the buccal cavity at centres where special experience exists. Lane-Claypon (Reports on Public Health and Medical Subjects, No. 59) has reviewed the statistical literature. She concludes "It is probably fair to say that some 25 per cent of patients operated upon will be alive and well three years after operation and 20 per cent at five years."

Although the number of cases treated by radium is relatively small, the three and five-year results are about the same as those obtained by surgery. But the likeness ends there for the results by radium have been achieved not only in operable but also in inoperable cases, and with no mutilation to the patient and no impairment of function. We all appreciate the art of surgery, but the selective action of the gamma ray in certain types of malignant disease and in particular epidermoid carcinoma of the mouth and tongue with complete restoration of function must be placed on a higher plane, if degrees there be. The question naturally arises as to whether we can confidently look forward to improvement in results. I think we can if the following points are considered.

Early diagnosis is essential, the more so because involvement of the lymphatic nodes is early and increases the gravity of the prognosis. With the education of the general public, particularly with regard to oral hygiene, I feel that as the present generation reaches middle and old age the incidence of oral carcinoma will diminish and that they will seek advice and treatment at an earlier stage when abnormalities exist. At the present time, in the hospital class of patient, one feels that if the patient will tolerate for many years, as he undoubtedly does, a mouth filled with carious teeth, of all shapes and sizes, the presence of an early carcinoma is an unnoticed incident in his daily life. Commonly, such a patient with an immobile tongue will give a three weeks' history only!

Secondly, I believe in the concentration of radium treatment at large centres. I know from my own personal experience that results with the same radiological technique improve with experience, and that only from the follow-up of large numbers of cases can one correct one's faults. The same remarks, I think, apply equally to the performance of a block dissection, which at present is often an integral part of the treatment of a case of buccal carcinoma. Unless the surgeon has opportunities for the frequent performance of this operation, I think the results will be poor. One must always remember that Nature does not help us a great deal, so far as we know, in malignant disease, whereas in the inflammatory diseases she plays a big part. To my mind this is the most important point in favour of the treatment of malignant disease by surgeons, radiologists, or what you will, who have made a special study of the disease.

(Slides were shown which illustrated the good functional results from radium, and, more important, the length of time which had elapsed since treatment over two years ago without recurrence.)

ANALYTICAL SYNOPSIS

Radium treatment of carcinoma of the mouth and tongue was the subject of the three papers published above. The following gives an analytical synopsis of these most valuable contributions by Mr. Stanford Cade (London), Dr. Douglas Quick (New York), and Mr. G. E. Birkett (Manchester), whose paper was read by Professor Burgess. In many respects there was remarkably close agreement between these three workers, and as a result there emerged a fairly authoritative declaration on the radium treatment of buccal carcinoma. For treatment of the primary growth all were agreed on the advantages of radiation over surgery, but whereas Mr. Cade and Mr. Birkett favoured radium needles, Dr. Quick preferred radon seeds. In the opinion of the first two authorities it was difficult with seeds to obtain a uniform intensity of radiation, not only because the intensity of the radiation rapidly diminished within a period of four days but also because the small seeds could not be so accurately placed as the larger needles. Carcinoma of the posterior part of the tongue, especially in or near the vallecula and the lingual tonsil, was much more radio-sensitive than the more differentiated carcinoma of the anterior part of the tongue, but it was prone to give rise to early metastases. For the treatment of metastases of the neck that were operable, all the speakers favoured free surgical excision on the lines laid down by Crile. They stressed the importance of very radical removal, and urged that the operation should be carried out only by those who were specially trained and practised in the performance of this operation. An incomplete dissection of the neck was worse than useless. When there were large inoperable metastases the glands should be actively treated by radium needles in large doses, and the balance of opinion favoured open operation as the method by which this treatment should be carried out. For early cases in which no palpable metastases could be found there was sharp divergence of opinion as to the treatment of the neck. Mr. Birkett advocated a waiting policy, provided the patient reported for examination once a month. Mr. Cade and Dr. Quick, on the other hand, believed that the neck should never go untreated. Mr. Cade advocated needling of the neck by the closed method, or, as an alternative, external treatment by means of a radium collar. Dr. Quick employed heavily filtered high-voltage x-radiation, and more recently a four-gram radium element pack. Speaking of the radium bomb at the Westminster Hospital, Mr. Cade felt that it was too early to form a judgment of its value, but he did feel that it was not an economic method of using radium, for the same amount of radium in the form of needles would treat ten patients where only one could be treated by the bomb. Dr. Quick stressed the importance of cleaning the mouth before treatment of the neoplasm was begun, and as a preliminary to irradiation of the primary tumour he recommended external irradiation of the neck and the site of the primary growth for a period of two weeks. The results of treatment reported by the speakers cannot be adequately reported in abstract, but the impression formed was that radium gave results that were definitely better than those of surgery alone; especially when it was remembered that healing was attained with no impairment of speaking, eating, or drinking. Mr. Birkett made a strong plea for the concentration of radium treatment at large centres.

MODERN METHODS IN THE TREATMENT OF CARCINOMA*

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DURING the past twenty years or more intensive work has been carried out in several European clinics upon investigations into, and standardization of, methods of treating carcinoma. The work of Forsell and his associates in Stockholm, of Regaud and Roussy and their associates in Paris, together with the activities of the Brussels school, have laid the foundations upon which what appears to be an important advance in our attack upon the problem is to be built. During recent years, interest in the subject in London has become very marked. The writer has recently returned from a somewhat prolonged trip to several of the more important British and European clinics, and this paper is largely based upon the experiences of these visits.

Despite the fact that the injection into the body of certain colloidal substances, more especially lead and selenium, have been followed in a comparatively small number of cases with results which suggest that it may be possible to affect the growth of carcinoma by means other than a direct attack upon the tumour itself, hitherto, at least, the usefulness of any such procedure has been very problematical. For many years the standardized methods have been those in which an attempt is made to destroy or remove the tumour cells from the body by mechanical means. Until very recently the only means employed for this purpose were the surgeon's scalpel and the actual cautery. During recent years there have been added to our armamentarium three other procedures, namely, (*a*) electro-coagulation; (*b*) the x-rays; and (*c*) the gamma rays from radium —which happily have been found to destroy cancer cells in consequence of a selective action.

* Read before the Montreal Medico-Chirurgical Society, October 17, 1930.

Of these procedures that known as electro-coagulation is the most straightforward and at the same time the least selective. Here, by means of a large indifferent electrode placed at some distance from the tumour and the application of a small electrode to the tumour itself, and to the tissues immediately surrounding it, sufficient heat is generated in the neighbourhood of the small electrode, in consequence of the electrical resistance of the tissues themselves, to coagulate or cook the latter. Electro-coagulation, although it is selective to only a moderate degree, in that it destroys normal tissues almost as extensively as it does the cancer cells, has the advantage as compared with the scalpel of not running the risk of spreading cancer cells in consequence of manipulation. Suffice it to state that electro-coagulation in this way has gained for itself a definite place in the procedures that are available in our attack on carcinoma. More especially is this the case in cancer of the tongue and certain other mouth tumours, of the vulva and certain otherwise inoperable tumours of the breast.

The use of radium in the treatment of cancer has opened up a new field of surgery. Although much of this field is as yet unexplored, the experiences of the past twenty years, and more especially the experiences of the last few years, would indicate that we may expect remarkable developments in the immediate future. Special attention has been attracted to the subject since the publication in 1928 of a monograph by Professor Forsell, based principally on experiences at the Radiumhemmet in Stockholm.

In 1898 Madame Curie, carrying on the work originated by herself and her husband, discovered radium. From the physicist's and chemist's point of view this discovery was of the utmost importance, as it altered the conception of the atom as an indestructible unit.

Soon after the discovery of this element, Becquerel, while carrying radium in his pocket, accidentally discovered that the radiations possessed a destruction action for human tissues. From this time many experiments have been carried out with a view to determining: (1) the nature of the action of the radiations which result from the decomposition of radium upon the tissues; (2) the manner in which they act; and (3) the development of methods whereby the effect of the ray could be made more destructive to one type of tissue than to another.

It was early discovered that carcinoma cells were subject to the injurious effect of the ray with the exhibition of a dose which did not seriously injure normal tissues. Carcinoma of the skin was early proved to be curable by this agent, and carcinoma of the uterus also, was found to be susceptible to its action. It is, however, only during the past few years that the general surgical possibilities of radium have been appreciated. It is not too extravagant a statement to say that for the first time in the history of surgery "we hold in our hands a power which beyond any question can cure cancer in many of its forms and which can destroy a malignant growth without its surgical removal" (Souttar).

The greatest care is necessary in the use of this new agent and the recent increase in the applicability of radium to the treatment of carcinoma has been in large measure due to the accumulation of information with reference to the dosage of gamma rays which can be expected to destroy cancer cells but at the same time to leave the normal tissues in the neighbourhood unhurt. The gamma rays produced by radium, in addition to their capacity for destroying tumour cells, exercise a definitely stimulating effect upon the normal tissue cells, especially in the production of fibroblasts. This fact is of the utmost importance.

Let me first refer to the work of Professor Forsell, Dr. Bervin, and their associates at Stockholm. I cannot speak too highly of the organization of this clinic, the careful treatment received by the patients, and the extraordinarily adequate "follow up" system. At the same time the outstanding merits of the clinics in these respects were overshadowed by the unusual kindliness and courtesy of the men in charge. Prior to my visit to Stockholm I had heard Professor Forsell spoken of in the most extravagantly appreciative language. I can only say that I am prepared to subscribe to anything that I had ever heard spoken well of him. He gave me many hours of his time, and discussed the benefits of organization of an institution for the treatment of cancer and other malignant diseases, methods of protecting the workers with radium and x-ray, and ex-

plained the manner in which their "follow up" system, which has proved so valuable, is arranged.

The Stockholm method of treatment of carcinoma by means of radium and x-rays differs from that practised in Paris and Brussels, and used for the most part in London, in that larger doses of radium are employed for shorter periods. There is still an argument as to whether the carcinoma cell is more surely injured by what might be called a sudden large dose of the gamma rays applied for a short period, or whether a smaller dose of ray exhibited over a more prolonged period, so that new cells may reach a mitotic stage, is the more successful. I have no grounds for forming a personal opinion in this regard. It would appear, however, that the technique employed at Stockholm is eminently satisfactory. One cannot but feel, therefore, that even though their method be not the very best possible, it is at least a good method. It is, moreover, economical of hospital beds and of radium.

Fifty-six beds are available for the use of the general surgical cases and a daily polyclinic is held. During the course of 1928 they treated approximately 1500 cases indoors and about 6000 cases in the polyclinic. Although the majority of the cases treated are carcinoma, other diseases which in the opinion of those in charge are suitable for radiological treatment, come under their care. In this group are sarcomata, angiomata, a selected group of tuberculous glands, and a certain number of cases of Graves' disease. In addition, there are always under treatment a comparatively large number of cases of the different leukæmias and Hodgkin's disease.

The daily routine at the Hemmett is as follows. At 8.00 o'clock, or somewhat earlier, a group of from three to ten cases arrive at the polyclinic, by appointment, for intubation with radium or the application of plaques. The cases so treated are composed of skin carcinomata, including rodent ulcers, cancer of the lip and angiomata. As a general routine intubation is employed, a superficial application of plaques being used for angiomata and rodent ulcers. In the treatment, for instance, of carcinoma of the lower lip the size of a ten-cent piece, five or six tubes, 1.5 cm. in length, and containing 10 mgm. of radium with a platinum gold filtration equal to 1.0 mm. lead, are inserted about and beneath the tumour. As will be seen, treatment continues for from two and one-half to four hours. Between 8.00 and 9.30 a.m. the outdoor cases are treated, and during this time also indoor cases may be brought down to the small operating room, which is in the polyclinic, for electro-coagulation or for intubation. At 9.30 precisely, the whole staff, together with visitors, makes rounds daily. Every patient in the wards is visited, his or her tumour inspected, the dosage of ray already exhibited checked and, the future course of treatment specifically confirmed or modified. Approximately one and one-half hours is used in making rounds in this way. At 11.30 the polyclinic proper commences, for the reception of new cases and checking up of return cases. As the outpatient clinic continues without interruption until about three o'clock, the visitor is wise to take advantage of the fifteen or twenty minutes which usually is available between the completion of ward rounds and the starting of the polyclinic, to go out for a few minutes for a cup of coffee and a pastry. The cases reporting are, for the most part, classified, particularly in so far as return cases are concerned. For instance, on Monday and Thursday the cases will represent carcinomata of the lips, tongue, buccal mucosa, pharynx and fauces, and on Tuesday and Friday most of the cases will represent carcinomata of the breast.

As photographs and paintings are made of nearly all the cases when first seen and thereafter periodically as progress is noted, and as very accurate records of the actual treatments are kept, it is possible for a visitor to receive a comprehensive idea of what has been done and of the results of such treatment. Between the indoor and outdoor clinics I estimated that I had the opportunity of carefully examining, and estimating the effects of treatment in from 25 to 50 cases suffering from cancer each day that I was in Stockholm. Apart entirely from the specific observation of the use of radium, this experience provided a unique opportunity for the study of carcinomata in general.

Between noon and half past one the radium which has been inserted in the polyclinic cases is removed. That is, treatment is employed for from two and one-half to four hours. The

tubes are cleaned, re-sterilized and inserted into a new group of patients who have been notified to present themselves. These cases remain in the clinic during the afternoon. The radium inserted is removed between five o'clock and six-thirty and the patients go home.

In order to ensure that no harm come to the staff from the handling of radium or the use of the x-ray, the actual technique is carried out by student nurses, who it can be presumed will not be further exposed to the action of the ray after the completion of their three months on the cancer service. During this period the greatest care is exercised and the time of the young women divided between the use of the x-ray, radium technique, and the usual nursing procedures. The permanent nursing sisters in the institution are prohibited from having anything to do with the radium containers, nor do the doctors on the staff expose themselves in any but the most absolutely necessary fashion to the radiations.

Possibly the most striking feature of the organization at Radiumhemmet is the "follow up" system, which has done so much to add to our knowledge of the treatment of cancer. Every patient when discharged from the polyclinic or from the hospital is given a card on which the date of his or her re-entry to the clinic is indicated. A special department of the institution takes note of this date at the same time. When the time arrives for the patient to revisit the home the green card with which the patient has been supplied serves in lieu of railway transportation, so that there can be no excuse on the grounds of financial embarrassment for the patient not visiting the clinic as ordered. If within a few days after the date upon which the patient should have presented himself, he has not done so, he is communicated with by letter and if no response is obtained, both the practitioner whose name appears upon the records is written to, and the police are communicated with. In this way practically no cases are lost sight of and in so far as possible autopsy findings in all cases who die away from Stockholm are incorporated in the records.

The Stockholm clinic is very enthusiastic regarding the use of the bomb, or "telecurie therapy", as it is called in Paris and Brussels. They have two bombs, one containing from one to two grams of radium and the other, five grams. The larger bomb is housed in a room by itself, and is so fitted with mechanical methods for adjustment that the minimum of exposure to the rays on the part of the attendants is required. The smaller bomb is the receptacle in which all radium not otherwise employed is kept. Since a large number of cases are treated by intubation in the daytime and the radium removed from them placed in the bomb at night, this apparatus contains a variable amount of the element. As compared to the technique employed in Paris, Brussels and Westminster in London, the radium is used over a smaller field and at a much shorter distance, namely three to five centimetres. The fundamental principle underlying their use of the bomb is multiple points of entry, or crossfire of the lesion.

Radon is not used at Stockholm, chiefly apparently because they believe it is dangerous for the technicians preparing the seeds or tubes. Most of the radium at Stockholm is in 1 or 1.5 cm. tubes. They do not call them needles nor have they a sharp point. The tubes are made of gold and platinum and have a screening strength equal to 1.0 mm. of lead. They contain either ten or five mgm. of radium element, chiefly the latter. These tubes are used for insertion in the tissues or for implantation in dental compound for application on the surface. They are usually employed for comparatively short periods, two and one-half to four hours at a time, but, especially for surface applications, may be employed repeatedly on successive or alternate days. Before fixing the tubes in the dental compound they are wrapped in one thickness of tinfoil which makes them much more easily cleaned as the compound has a tendency to stick to the tubes. Flat applicators are also used for surface application.

Roentgen ray therapy is employed very extensively at Radiumhemmet. They use it both before and after operation, particularly in cases of breast carcinomata and before radium in extensive cases, more particularly, of faucial tumours, especially those associated with inflammation.

Electro-coagulation is extensively used in the case of mouth tumours and in carcinoma of the vulva. A common routine in the mouth tumours

is first the x-ray, then electro-coagulation, and at the same sitting the insertion of radium tubes.

I was very favourably impressed with the surgical work done in Stockholm and spent several interesting mornings at the clinics of Professors Key and Soderlind and Dr. Hybennette. The most cordial and useful co-operation on the part of the surgeons and the radiologists exists. It is almost literally true to state that no surgeon in Sweden would at the present time operate on any tumour in which any question of malignancy was considered without first referring the patient to one of the radiological centres.

There is perhaps no problem in surgical procedure which is interesting surgeons at the present time more than the proper treatment of carcinoma of the breast. It may be taken as established that the treatment of choice in cases of inoperable tumours is radiological or by the employment of diathermy. It is, however, with reference to the early operable cases that difficulty is experienced in estimating the relative value of operative or radiological treatment or both.

It is a well-known fact that during the past five years at St. Bartholomew's Hospital, and more particularly by Mr. Geoffrey Keynes, a larger and larger number of cases of carcinoma of the breast have been treated by means of radium implantation. I have had the opportunity of watching Mr. Keynes place needles in several cases and have seen many of his cases, one, two, three, and four years after the original treatment. The results are striking. As compared with the usual operative procedure, with its extensive dissection and ultimate mutilation, the treatment of these cases by the implantation of a few needles is little short of miraculous. If we could be convinced that the patient's chances for ultimate recovery were equally good by means of radium the matter would not be open to argument.

Mr. Stanford Cade, at Westminster, uses a technique which is comparable in most respects with that employed by Mr. Keynes. He has added to it, however, the application of radium at a distance by means of Columbia paste shields applied to both the front and back of the chest. He uses the maximum possible dosage in this respect, and is not content until he obtains peeling of the epidermis. At the same time Cade is not willing to support the procedure to the exclusion of operation in early cases. At Stockholm radium is not employed in the treatment of carcinoma of the breast, except in cases of local or glandular recurrences. This, I believe, is due, in the first place, to the fact that they have obtained relatively satisfactory results by the technique which they have employed for some time, and partly because they find more useful employment for their available radium in other cases.

The routine technique employed at Radiumhemmet is one or two pre-operative courses of x-ray radiation, employing five fields of entrance. The total dose at each of the fields of entrance during each course is one or one and three-quarters of an erythema dose. If two pre-operative courses are employed, two months is allowed to elapse between radiations and, in any event, operation is undertaken six weeks after the last pre-operative radiation. The usual Halstead type of radical mammectomy is performed. For this purpose the patient is returned to the surgeon, who has originally referred the patient to Radiumhemmet. Following operation, one, two, three, or sometimes four post-operative radiations are carried out at from three to six months' intervals. Three fields of entrance are used for post-operative treatment.

I was more impressed by the treatment of three individual cases of inoperable carcinoma of the breast in Stockholm than by any other group of cases that I saw. These three cases were very similar in character. Each presented a tumour, somewhat larger than a hen's egg, in the breast and each had glandular metastases. In each of the three cases roentgen treatment brought about a complete disappearance of the tumour in three to four weeks and in each of the cases the glands subsided until they were practically impalpable.

Buccal tumours are treated at Stockholm by means of electro-coagulation. A flat electrode from 0.5 to 1.5 cm. in diameter is employed. A weak current, never more than one ampère, is used, so that the time of application of the current is relatively long. It is striking that during the application of the current there is no odour of burning tissue, no smoke and no sparking. The day following coagulation the tissue is firm and is not blackened over the surface. The destroyed tissue is left to exfoliate

without any attempt being made to remove it by mechanical or other means. Tumours of the anterior two-thirds of the tongue are coagulated, and the tissues immediately about the coagulated zone are intubated with radium tubes.

The Stockholm clinic has not employed radium in the treatment of carcinoma of the rectum. They have employed pre- and post-operative deep x-ray therapy but are very unwilling to make any statement as to its usefulness. They are also unwilling to give an opinion regarding the use of radiation in the treatment of either gastric or œsophageal carcinomata.

We spent just under two months in Paris. During this time I had an opportunity of seeing the surgical work being carried out in most of the large hospitals and followed the tumour cases at the Fondation Curie under Professors Regaud and Lacassagne, and at Ville Juif, under Professor Roussy, Madame Laborde and Wickham. I also enjoyed a few mornings at the Hôpital Tenon with Maillet. The work with radium in Paris is very interesting and as is well known has added much to our knowledge of the subject, but it is less well organized from the visitor's point of view than at Stockholm or in London. Inasmuch as the work in London is largely based upon that carried out in Paris, I believe it is better for the visitor to spend more time in London than in Paris.

A few days only were spent in Brussels. During this time I had an opportunity of getting in close touch with Drs. Neumann and Coryn. I also spent an afternoon with Max Cheval, who, along with Mayer, had owned a four-gram bomb for several years. They had set for themselves definite principles for its use which resulted in long and often repeated exposures to the ray. The results obtained in the individual cases were judged by them to be satisfactory, but at most they could only treat eighty cases during the year. This made the expense of treatment so great as to render it economically impossible. Mayer and Cheval were forced for economic reasons to dispose of the bomb. It was sold to Westminster in London. The radium has been placed in a new bomb and is in use at the Westminster Annex, Hampstead. The bomb employed at Westminster Annex is similar though not exactly the same as that used by Mayer and Cheval. It permits of the treatment of more cases during the year, but the distance that is being employed, that is 10 cm. from the skin, and the size of the area of exposure is so great that the results obtained have not been very satisfactory. Westminster also has a smaller bomb in use at the main hospital. It does not appear to be a very satisfactory apparatus and as a matter of fact I am informed that the results leave much to be desired. I did not have an opportunity of observing the results obtained by the use of the bomb under the control of the Fondation Curie in Paris. I believe, however, that they are very much less enthusiastic about its use than they are in Stockholm regarding its effect on carcinoma. I do not wish to pose as an expert in any way with reference to telecurie therapy. It would appear, however, that the type of bomb employed in Stockholm and the technique used by them are better than those employed elsewhere. Mr. Cade has described to me a method he is working upon at the present time, which, if he is successful in obtaining the apparatus which he hopes for, should go a long way towards placing distance therapy upon a sound basis.

In those centres where a bomb is out of the question, for financial reasons, it is evident that at least comparable results may be obtained by the use of Columbia paste and distance radiation by means of collars, plaques and shields. In this connection it is perhaps worthy of mention that Cade has had made helmet-like appliances fashioned out of sponge rubber. These he employs for distance radiation in cerebral tumours.

My visit to London was divided into two parts, one in the late summer of last year and again during April and May of this year. During this time I made my chief interest the visiting of those institutions where it was known that the treatment of carcinoma was being seriously carried out. I visited the London Hospital where I had the technique employed with radium seeds very carefully described, and had an opportunity of watching the seeds being prepared. The two young men at present engaged in the preparation of the emanation seeds are very fit and healthy in appearance. They both have considerable time off and are urged to spend this time, in so far as possible, in the open air.

All too short a time was spent at Middlesex, where, however, I had explained to me their system of organization and had an opportunity

of seeing their experimental animals. I was particularly interested in the careful way in which the treatment of oral tumours was undertaken. Plasticine models in colours of the affected parts with the tumour introduced into the model allow the surgeon to estimate by actual experiment the number of needles together with their size and the manner of introduction which would more surely irradiate the whole of the diseased area. It is needless to remark that this manner of approaching the subject is very time consuming and laborious. At the same time, it indicates the care which must be taken in the intubation of tumours if the best results are to be hoped for.

I was extremely fortunate last summer in arriving in London a short time before a special intensive course upon the use of radium in the treatment of carcinoma was undertaken at St. Bartholomew's Hospital. All the members of the staff interested in radium and including Sir Charles Gordon-Watson, Professor Gask, Professor Hopwood, Mr. Keynes and Dr. Finzi, devoted much or all of their time for a whole week in order that the subject might be properly presented. Old cases had been called up so that late results might be demonstrated and new cases were made available that demonstrations of treatment might be carried out. At St. Bartholomew's both radon seeds and radium needles are employed. I believe I am right in interpreting their opinion, relative to the comparative usefulness of these two methods, that, except for the fact that the seeds need not be removed, the use of needles containing radium element is better.

The St. Bartholomew's staff are most open-minded with reference to the use of radium, both as to manner for its employment and also as to the relative usefulness of operative surgery and radium treatment. As is well known, Mr. Keynes, whose industry and carefulness has been largely responsible for the standardization of a method for the treatment of carcinoma of the breast by means of radium implantation, has now treated a large number of cases by this method alone. (Up to October 1, 1929—130 cases). He expressed himself as being of the opinion that it is at least as good as surgery in its end-results, and this without mutilation and risk of serious interference with arm function which accompanies operative treatment.

Time does not permit me to describe in detail the practice of this method. It may, however, be of interest to indicate the general features of the technique. The primary tumour is irradiated by means of long needles placed approximately 1.5 cm. away from one another deep to the tumour and in most cases another layer superficial to the tumour is placed at right angles to those introduced below. In addition, particularly in the case of large tumours, a series of needles are placed about the tumour. Needles are placed above and below the clavicle and one into each of the three upper intercostal spaces. The lymphatic regions of the axilla are reached by means of three or four needles placed along both axillary borders, with two or three needles introduced into the apex of the axilla. From 45 to 100 mgm. of radium are required, contained in from 20 to 36 needles. At St. Bartholomew's needles have been allowed to remain in ten days and are then removed. Skin burns occasionally take place. They have, however, healed without trouble at the end of from four to six weeks.

After removal of the needles the patient is kept under observation for some months, and if at the end of nine months there is a suspicion of residual tumour the case is either again treated with radium or an operation is performed. Keynes states that in no case have the axillary vessels or nerves been injured, and although he knows that in one case the pleural cavity was punctured, this accident has never happened in his own experience. At St. Bartholomew's no further treatment has been adopted as a routine procedure, as for instance post-irradiation operation, or the employment of a Columbia paste shield with distance radiation. It may be mentioned in this respect that at Westminster Mr. Cade, who employs a method of intubation practically identical with that used by Mr. Keynes, makes a practice of very intensive distance radiation by means of Columbia paste plaques to both front and back of the chest. He is not satisfied until practically complete exfoliation of the epidermis has been obtained in this way.

Professor Gask's contribution had to do with tumours of the mouth, more especially with tumours of the tongue. The mouth tumours are treated by intubation without any attempt at surface treatment or electro-coagulation. Ac-

cording to Professor Gask's technique the neck is treated by means of needling, carried out in such a way that the gland-bearing areas are exposed to the action of the ray.

Not the least interesting of the presentations was that contributed by Sir Charles Gordon-Watson. Sir Charles' special interest, as is well known, has to do with carcinoma of the rectum. He has employed radium extensively by all the known methods, including Neuman's technique for the irradiation of tumours of the rectum from behind. He has prepared a moving picture film which admirably demonstrates the manner of this technique. Despite the amount of work which Sir Charles has done upon the subject, he is extremely modest with reference to it and is unwilling to make any positive statements. I was particularly interested in his description of treatment of tumours placed high up in the tract by means of radium, either seeds or needles, introduced per abdomen.

Dr. Hopwood, who is Professor of Physics at the Medical School, and who is in charge of the radium supplies, including the apparatus for the preparation of radon, gave us a series of lectures upon the physical and biological properties of radium which made this intricate subject extremely clear. The care with which the needles must be handled to avoid injury to them and the necessity for frequent checking of the needles for injury was very interesting.

Other than that at Stockholm I found my association with Mr. Stanford Cade the most satisfactory, although in making this remark I do not wish to imply even the remotest criticism of any of the other clinics at which I was so kindly treated. As a member of the staff of Westminster Hospital, including the annex of this hospital in Hampstead, and as a member of the staff of the Northwood Hospital for the treatment of cancer, Mr. Cade has under his care a very large number of cases and at the same time has access to many grams of radium. As he is primarily a surgeon and is well trained in operative work the quality of the work done by him is of a very high order. From the moment that I first presented myself to Mr. Cade I found him to be extremely courteous and kindly. Along with all the other serious workers in the field of radiation treatment of carcinoma he is admittedly groping for the most useful methods.

With regard to carcinoma of the mouth, including the tongue, buccal mucosa, pharynx and the palate, Mr. Cade depends entirely upon the use of radium and does not employ coagulation. He is perfectly satisfied and his cases demonstrate the fact that it is possible to bring about healing of the primary tumour without disfigurement. In the treatment of the glandular areas in the neck he is of the opinion that in all early cases a block dissection of one or both sides of the neck should be carried out and that in addition gamma radiation by means of a collar at a distance of 1.5 cm. should follow. He is insistent that no treatment of the neck should be undertaken until such time as the primary tumour in the mouth has been disposed of.

In all cases in which it is judged advisable to employ distance radium by means of external application of Columbia paste plaques, Cade continues the use of radium until more or less complete exfoliation of the epidermis has been accomplished. This effect upon the skin must not be confused with the phenomenon of radium necrosis. As compared with the latter process exfoliation or peeling is painless and heals.

Mr. Cade has had considerable experience in the treatment of carcinoma of the rectum and is of the opinion that with refinements in technique better results will be obtained in the use of radium, although at the present time he agrees with other experienced workers that if the case is operable surgical interference should be carried out. I watched Neuman resect a rectum by the abdomino-perineal method. He did not use radium and although no colostomy was performed he preserved the sphincters.

It is evident, I believe, that the technique of the treatment of carcinoma of the colon, stomach and œsophagus by means of radium requires much more intensive study and experimentation than it has hitherto received before any positive statements can be made with reference to the subject.

One afternoon during the meeting of the Surgical Association of Great Britain and Ireland was devoted to the presentation of cases by Dr. Todd, together with an analysis of the subject of the treatment of carcinoma by means of lead selenide. This investigation which has been carried out at Bristol during the past five years at least suggests that it is possible that treatment of carcinoma may yet be carried

out on more purely biological principles than has hitherto been the case. At any rate it may be stated at the present time that a fairly large number of competent observers are of the opinion that every case of carcinoma not otherwise susceptible to treatment should be given the chance of at least improvement by means of Todd's method.

Time has not permitted me to discuss in any detail the possibilities of combined surgical and radiological treatment of carcinoma. It is certain, I believe, that more is to be expected in this direction than has heretofore been thought possible. At the same time improvements are to be looked for in the direction of what has been designated "surgery of access".

Hitherto at least three-fourths of the patients presenting themselves for examination and showing evidence of cancer have allowed the disease to progress to such an extent that hope for a permanent cure could not be considered possible. One of the most important by-products from the use of radium and roentgen-ray should be dependent upon the fact that if the laity realize that, in the first place, by means of radiation the disease can be cured, and, in the second place, if they believe that this result can be obtained without serious mutilation, the fear of a cancer diagnosis will be much mitigated. Without such fear it is to be expected that patients will present themselves in larger and larger numbers at an early stage in the course of the disease. It is not unreasonable to state that were the diagnosis of cancer made sufficiently early in each individual case all patients could be cured.

RADIUM IN GYNÆCOLOGY*

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THIRTY years ago radium made an entry into surgical therapeutics and was greeted with enthusiasm on reports of the cure of malignant tumours. Claims were made which were never substantiated, or results were so transient that recurrence of the growth followed hot-foot upon the reports. In the course of five or six years disillusionment was complete, and radium treatment was left to the few who still had faith. We are now in the second advent, and the enthusiasm displayed suggests that history is repeating itself. Responsible men are making themselves answerable for statements that 70 to 80 per cent of early cancers are curable by radium. Such claims may possibly be prophecy; they are not history. There is a glut of hastily written books on treatment by radium, and a still greater stream of reports of cases treated within the year. I recently attended a lecture by the director of a radium clinic who recorded cures of one, two, and three years' standing. What does the word "cure" mean? Is it the disappearance of symptoms for a limited time, or is it permanent freedom from disease? Assuredly the latter is the only meaning, and the propriety of using the word in any other sense is open to criticism. This enthusiasm, sired by our profession and nourished by the press, has placed an enormous sum of money in the hands of a Radium Commission for the purchase of 24 grams of radium element. It is proposed to distribute the whole of this for clinical work, not one milligram being allocated to biological research. One would suppose that there was nothing unlearned of the effects of radium upon living tissues, and that, given the supply, the disappearance of the cancer was only a matter of application. A certain amount of work has been done upon normal tissues, tissue cultures, and animal tumours. The knowledge gleaned from these sources is of great value, but it must be multiplied ten, twenty, and a hundredfold before we are in a position to direct the gamma ray with precision and certainty. At present the only research radium in the country amounts to something less than a gram, privately owned

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and divided into small quantities. If all the problems to be investigated are to depend on this supply alone, then another generation must pass away before they are solved. These problems are urgent and imperative, and must be attacked while the wave of enthusiasm is high. The Radium Commission would serve the community to the best advantage in the organization of research work and in the allocation of whatever radium is necessary for the purpose.

How Radium Acts

It is a matter of dispute between workers whether radium acts directly upon the cell or upon the stroma. The microscope shows us the change of structure which has taken place in the tissue after irradiation, but it tells us nothing of how or why the change has taken place. The ingenious application of cinematography by Canti to irradiated tissue cultures has extended the knowledge acquired by the study of the dead cell, but while we have a dramatic view of the cell being struck down it does not solve the question why it is smitten. This effect may be due to direct action on the cell by the gamma wave, but it is equally probable that it is caused by a primary change in the stroma. After a long investigation[1] of the effects of radium upon normal and malignant tissues I was forced to the conclusion that the primary action was upon the stroma, and the cell change secondary to it. This problem, however, is not to be settled by the study of structure alone; it must be combined with observation of the change of function in secreting and excreting glands after irradiation. Furthermore, the help of the biochemist must be enlisted to investigate changes in the chemistry of the cell after exposure to radium. The importance of this question cannot be exaggerated, for upon its solution depends the deciding of the dose to be employed.

Screens

One would think that the value of metal screens must have been settled long ago, and yet the following values are given in three different books for the absorption of 99.9 per cent beta rays:

	Brass	Silver	Lead	Platinum
Cade	1.60 mm.	1.30 mm.	1.20 mm.	0.60 mm.
Larkin	2.0 mm.	1.0 mm.	1.0 mm.	0.50 mm.
Simpson ..	1.10 mm.	0.80 mm.	0.80 mm.	0.40 mm.

Russ[2] has shown that with 0.5 mm. platinum about 20 per cent of the ionization is due to the moderately penetrating rays, and they are responsible for the necrosis which occurs around the source of energy. This necrosis is either beneficial or inimical to the treatment, and therefore it is of paramount importance to ascertain the true value of the screen. Needles containing one, two, three, or more milligrams of radium element are being used for cancer of the tongue, breast, and cervix with a thickness of 0.5 mm. platinum, and the immediate results are reported to be satisfactory. On the other hand, the Radium Institutes of Stockholm[3] and Paris use a minimum equivalent of 1 mm. platinum, from which permanent results are reported. It is not probable that both methods are equally favourable, and it is imperative to determine which is the more favourable. Some experiments by Lazarus-Barlow,[4] in which he used screens of varying thickness—0.5 mm., 1 mm., 1.5 mm., and 2 mm. platinum—throw light on this problem. He found that the minimum injury to normal tissues and the maximum to actively proliferating cells was produced when the heavy screens were used. These results are crucial, but they need to be repeated and extended. A further point which needs investigation is the radiation value of the metals used for screens. Physicists tell us that 1 mm. platinum is equivalent to 2 mm. lead in screening power. Is it certain that the gamma wave which has passed through lead has a similar value to the gamma ray which has passed through platinum? Discrepancies in clinical and experimental work when using different screens of equivalent value suggest that this may be one source of error.

Split Doses

A problem equally pressing is whether the dose should be applied continuously or divided into two or more exposures. How far do living tissues conform to physical laws? *Ceteris paribus,* the ionization effects of 100 mg. of radium element for one hour are equal to 50 mg. for two hours. Does the law hold when living tissues are in question? In practice Radium-hemmet gives three large doses at intervals of ten and twenty-one days, whereas the Curie Institute gives a prolonged exposure of four, five, or six days of a smaller quantity. Can it be that both methods are equally favourable, or

are we treading the radium path blindly? Some experiments recorded by Lazarus-Barlow[5] suggest that this is a complicated problem. Using the same dose of radium, he employed a large quantity for a short time and a small quantity for a relatively long time, and found that the results upon columnar and squamous epithelium were practically reversed. He concluded that the same arrangement of time and quantity in a dose of radium produces very different effects when acting upon the three types of epithelial tissues — columnar epithelium, dry squamous, and moist squamous epithelium. Maximum effects are produced upon the epithelial cells, and minimum effects upon the associated tissues in the case of a columnar-cell growth when the quantity of radium is relatively large and the time relatively small; whereas in a squamous-cell growth the optimum effects are produced when the quantity of radium is small and the length of exposure relatively long. It is obvious that these experiments go to the root of the problem, but they need amplifying, and research work with this object must be organized.

Treatment of the Regional Glands

Finally, the clinical problem arises as to the treatment of the regional glands. The weakness of the Radiumhemmet technique is that it relies upon uterine and vaginal radium entirely, which means that the involved glands are being treated palliatively.

Various methods of applying radium in the pelvis have been tried, from Dael's chain, implanting radium and packing the pelvis with gauze for a week, fixing radium in drainage tubes, which are brought to the surface through stab wounds, to burying radium needles for a week at the end of which time a second laparotomy is performed to recover them. These methods are uncertain, inexact, and make a big call upon the woman's fortitude and courage. Some of these methods have been described as a "barrage of radium," an unfortunate term, for it is as likely to form a mental barrage to progress as a radiological one to exclude the cancer cell.

Recasens (Madrid)[6] has combined x-rays with radium for many years, and claims improved results over radium treatment alone. However, as far as I know, he has not published statistics in support of this claim. The Curie Institute has been using x-rays as well as radium since 1923-24; a comparison of its results before and since should prove instructive. A third method is coming into use in which the treatment of the cervix by radium is followed by excision of the regional glands. It is obvious that with such varied practice there is urgent need of organized research in this direction.

Radium in Benign Conditions

Whatever the view may be with regard to the treatment of carcinoma, there is no doubt about the efficacy of radium in producing an artificial menopause. Even here, however, there is a difference of opinion upon two important points: (1) dose of radium; (2) whether the endometrium or the ovaries are affected.

Dose of Radium

Here we find the differences somewhat startling.

50 mg. radium element in 0.5 mm. platinum *in utero* for seventy-two hours.

100 mg. radium element in 1 mm. platinum *in utero* for forty-eight hours.

100 mg. radium element in 1 mm. platinum *in utero* for twenty-four hours.

The object we have in view in menopausal hæmorrhages is to convert the endometrium into connective tissue without the production of necrosis. We find that this occurs experimentally and clinically when the hard gamma ray is used alone. A long exposure to beta rays produces necrosis of the tissues in the immediate vicinity of the radium. In the case where 50 mg. of radium element protected by 0.5 mm. platinum is placed *in utero* for seventy-two hours, 20 per cent of the ionization effects are due to hard beta and soft gamma rays; necrosis ensues, and if it remains aseptic partial or complete obliteration of the uterine cavity occurs. Complete obliteration may or may not be desirable, but with partial occlusion there is a grave risk of pyometra. If the necrosed surfaces become infected sloughs of the endometrium and secondary hæmorrhage follow, and when healing does take place it is again by way of partial or complete closure of the uterine cavity.

The larger doses of 100 mg. of radium element in 1 mm. platinum for twenty-four and forty-eight hours rarely result in necrosis, but it is quite common to hear of severe irritation of the bladder and rectum. This irritation is often transient, but it sometimes lasts for months de-

spite all treatment, and the patient has exchanged painless hæmorrhage for continuous pain and discomfort. Ascherson[7] reports the local changes which occur as a result of these heavy doses: hour-glass contraction of the vagina, atrophy of the portio, shortening and stenosis of the vagina, and ovarian neuralgia.

In 1926[8] I published the results of 200 cases of severe uterine hæmorrhage treated by 53 mg. of radium element in a screen equivalent of 1 mm. platinum placed *in utero* for twenty-four hours, and expressed the opinion that this dose was probably unnecessarily large. Since then I have (in some cases) reduced the time to twenty-two hours, and the results are no less satisfactory; with these doses there has not been a single complaint of irritation of bowel or bladder.

Does Radium Act upon Endometrium or Ovaries?

The German view, arguing from the analogy of the roentgen ray, that "radium acts by castration," is still widely held, despite clinical, physical, and experimental evidence. The law of inverse squares was ignored; the three and a half inches separating normally placed ovaries from radium placed in the uterine cavity was forgotten; the knowledge that the demonstrable action of radium upon tissues under similar conditions is limited to three-quarters of an inch was unknown when this argument was advanced. To settle this problem I undertook a critical investigation on the ovaries of cats, in which the conditions were precisely similar to those in clinical work. The results were conclusive in showing that the ovaries remained unaffected, and that the changes in the endometrium were alone responsible for the cessation of hæmorrhage. An account of these experiments and analysis of the clinical evidence was reported to the Gynæcological Section of the Royal Society of Medicine.[9]

Fibroids

Radium is used in the treatment of these tumours, but in my opinion when treatment is required at all it should be by excision, because while radium banishes hæmorrhage and causes the tumour to shrink, it will not make the growth disappear. Fibroids are peculiarly liable to degenerative changes, and therefore it is advisable to remove them. The only exception is where hæmorrhage is the cardinal symptom, and a small fibroid is discovered during an examination under anæsthesia; in such cases treatment by radium is justifiable.

Radium Treatment of Cancer of the Cervix

It is slowly being recognized that the early results are not permanent in the majority of cases, and therefore not worth recording except as evidence of the value of radium for palliative treatment. Reports on a five-year basis will alone enable us to assess the true value of radium in the treatment of malignant disease, and for this purpose they are equally important, whether favourable or not.

The classification of cancer of the cervix under the international standard is not easy, for the definition which creates Classes 2 and 3 covers inflammatory as well as malignant conditions, and it is sometimes impossible to differentiate between them. My series of cases in the five-year period 1921 to 1925 consists of 211, divided as follows:

1. Cases in which the disease was limited to the cervix (operable) 14
2. Cases in which the vagina and parametrium was involved and the uterus tethered (borderline) 53
3. Cases of advanced disease (inoperable) .. 144

Operable Cases

The following table shows the results in the 14 operable cases:

Recurrence of Growth				Remained Free = 28%
1 year	2 years	3 years	4 years	5 years and over
3	4	2	1	4

Remained free.—One patient was alive and well nine years after treatment. One died of chronic bronchitis and cardiac failure seven and a half years later. She had been treated with radium and x-rays. One was alive and well six years later. The fourth was alive and well five years afterwards.

Recurrence of growth.—In three patients recurrence took place in the cervix, and in five a pelvic mass developed while the cervix remained healed.

Borderline Cases

In 20 of these cases the condition improved so much after the first exposure to radium that I performed the radical operation upon them. The results of the remaining 33 are as follows:

Recurrence or Death within 5 years					Remained Free = 12%
1st year	2nd year	3rd year	4th year	5 years	5 years and over
13	8	6	1	1	4

Remained free.—In one a laparotomy had been performed at another hospital for a Wertheim's operation, but it was abandoned. She has remained under observation for eight and a half years, and is free from disease. The second was under observation for six years, during which time she remained well. The third is alive and well at the end of six years. This patient was treated with radium and x-rays. The fourth is alive and free from disease after five and a half years.

Recurrence or Death within Five Years:

CASE 180. This was a carcinoma of the stump of the cervix occurring some time after a subtotal hysterectomy. Three years after treatment her right breast was removed for a malignant growth. Two years later, and five years after the radium treatment, she returned with a mass in the pelvis, but whether it was a metastasis from the breast or a recurrence from the cervix was not decided.

CASE 172. In this case the patient died from cerebral hæmorrhage four years after treatment, but there was no recurrence of disease in the pelvis.

Of the 13 patients who were lost or died within the first year, one died of uræmia after one exposure, and one patient had one exposure and then underwent an operation at another hospital.

Recurrence took place in the pelvis in 10 of these cases. It is worth remarking that of the 14 operable and the 33 borderline cases, recurrence deep in the pelvis occurred fifteen times, which corresponds approximately to the number of cases in which the glands are found to be involved.

INOPERABLE CASES

Recurrences after Wertheim's operation.—These cases numbered 40. The difficulties attending their efficient treatment by radium are insuperable owing to the proximity of the bladder and rectum, and I have derived no encouragement from my results. Temporary relief was the best sequel, and not one patient survived beyond one year. Vesical fistulæ occurred in three cases, but it is not possible to say whether this was due to the growth or to the radium; it is certain, however, that a fistula would have resulted if left untreated, but it is probable that the treatment hastened the condition.

Advanced cases.—There were 104 of these, 10 of which were not suitable for treatment on account of fistulæ, metastases, or cachexia. Of the 94 treated 73 died in one year, 16 in two years, 2 in three years, 2 in four years, and 1 in five years.

At this stage of the disease there is no hope of curing the patient, but the symptoms, hæmorrhage, offensive discharge, and pain are relieved in 80 per cent, and life is prolonged in comfort for 20 per cent. In the cases which survived for three, four, and five years a slowly enlarging pelvic mass was present throughout, and pressure symptoms ultimately appeared.

In this class recto-vaginal fistulæ occurred in two cases and vesico-vaginal fistulæ in three. In advanced malignant disease of the cervix fistulæ are of common occurrence before the termination of life, and it is not possible to attribute them to the radium alone. I had to ligature the internal iliacs for secondary hæmorrhage on eight occasions; in three of these cases a virulent infection was present, and it is probable that the arterial wall had undergone such changes that secondary hæmorrhage was imminent, for in two of them it appeared within three days of the first exposure. In the third patient there was an interval of fifteen days between the first and second exposures, and the hæmorrhage ensued immediately after the second. In the other five cases healing of the ulcer had made great progress, but had reached a callous stage in which a small unhealthy cavity was surrounded by a massive deposit of fibrous tissues.

SUMMARY OF RESULTS

The total number of patients treated by radium was 181. In the inoperable cases the results were: palliation and prolongation of life, 134—none cured; borderline cases, 33—4 cured; operable cases, 14—4 cured.

The rate of cure in all the cases treated by radium was 4.5 per cent, or 1 patient out of 22; in the borderline cases 12 per cent, or 1 patient out of 8; and in the operable cases the rate was 28 per cent, or 2 patients out of 7.

If the advanced cases, where no cures could be expected, are omitted there were 47 operable and borderline cases, of which 8 were cured (17 per cent), or 1 patient out of 6.

REMARKS

These issues were not comparable to those of Radiumhemmet or to those obtained by operative surgery, and I attributed the comparative fail-

ure to an immature technique which was tentative and unsettled. Therefore in the current five-year period I adopted the technique of Radiumhemmet in one series of cases, and that of the Curie Institute in another. The latter I abandoned after treating twenty cases, owing to the production of callous ulcers which never completely healed. I persevered with the Stockholm technique, and, although the five-year period is not yet up, the conclusions do not show any improvement. I visited the Institutes of Stockholm and Paris to ensure that my methods did not differ in any material way and was satisfied that the technique offered no reason for the marked difference in results.

I remain a believer in the future of radium, but feel that to-day we are a long way from accepting it as a sovereign cure for all malignant tumours; in the meantime I am convinced that surgical treatment offers the patient a better chance of cure. Unless our knowledge of radium is greatly increased, and the immediate results of treatment are placed in proper perspective, I foresee a general resumption of treatment by operative surgery.

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DISCUSSION

PROF. W. W. CHIPMAN (Montreal) said that greater knowledge was required before realizing the value of radium, and greater care in its use was essential for success. He discussed its application in combating cancer and in controlling uterine hæmorrhage. In the latter condition the value was greatest when the bleeding was intrinsic uterine hæmorrhage from such conditions as subinvolution due to sepsis; it had lesser value in fibroids and the bleeding of adolescence. Radium acted by its effect, not only on the endometrium, but also on the ovaries, altering the hormonic output controlling menstruation. It should not be used indiscriminately in cancer, but only by those specially trained in its properties and application. In his own clinic in Montreal, between 1919 and 1929 only 289 cases had been treated, but the actual results were not known, since his follow-up of the cases was not yet complete; moreover, a long enough interval had not yet elapsed in many of the later cases to be of value in estimating its efficiency as a curative agent. His opinion of the position, however, was that all patients with carcinoma of the cervix should receive radium treatment if the condition was inoperable, and that at the present time radical operation seemed to offer more hope in the early and selective conditions. He suggested that the effect of radium on cancer depended to a large extent on the actual resistance of the patient.

DR. T. G. STEVENS (London) drew attention to the danger of using radium in the treatment of hæmorrhages in young people, resulting in an artificial menopause. He also spoke on the length of needles used, and that it would be more satisfactory and practical if the radium was situated towards the end of the needle in place of the centre.

DAME LOUISE MCILROY (London) raised the point that there was difficulty in diagnosing cancer until the woman is played out; she goes to the general practitioner, but fails to tell him of the symptoms, not wishing to have a vaginal examination. One of the most important things to note in regard to the treatment by radium is that we have a very small amount available. The use of radium by a proper technician is very desirable, and treatment by radium should not be engaged in by any but a qualified operator. If we are going to have results we must understand the technique.

A SOLID ANTI-COAGULANT.—O. Neubauer and H. Lampert (*Münch. med. Woch.*, p. 582, April 4, 1930) in searching for a substance which should have the anti-coagulating properties of paraffined glass, without its disadvantages, investigated the properties of various substances in relation to their tendency to hasten or delay the coagulation of the blood. They found that the degree to which a substance is moistened by watery fluids, such as water, blood, and serum, was, with few exceptions, in inverse ratio to the coagulation time of the blood in contact with it; they describe an exact method of measuring the degree of wetting. In a series of tested substances it was found that glass and quartz became most wet and caused the most rapid clotting, whereas paraffin and soot were least moistened and delayed coagulation longest. Polished metals, such as nickel, steel, and gold, were intermediate. The ideal substance for practical use where clotting is to be avoided should have the properties of paraffin in this respect, but should also be suitable for making into flasks, syringes, etc. It must therefore be hard, durable, transparent, sterilizable, and not too costly. Such a substance Lampert claims to have found in a condensation product of phenol and formaldehyde, which he calls "athrombit"; it is not so breakable as glass, is resistant to acids (but not alkalis), and is alkali-free. Using the same method and volume of blood in each case, the coagulation time at room temperature in glass was fifteen minutes, in athrombit forty minutes, in paraffin forty-two to forty-three minutes. The authors describe a method for the transfusion of unaltered blood by means of vessels made from this substance and its use for the estimation of the coagulation time.—Abst. in *Brit. M. J.* July 12, 1930.

COMPLEMENT FIXATION IN SCARLET FEVER WITH IMMUNE SERA*

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IN a previous paper,[10] I gave the results obtained with complement fixation with the sera of scarlet fever patients, using antigens prepared from the *S. hæmolyticus scarlatinæ*, as compared with those obtained from other streptococci. The results obtained incited me to see whether, by using the complement fixation test with immune sera prepared from this microörganism, one could differentiate the *S. scarlatinæ* from other similar streptococci.

Very little work has been done in this field, as, so far, all previous investigators, like George,[9] did not succeed in this differentiation with this method. Andersen,[1] on the other hand, testing 61 strains of scarlet fever streptococci and 27 strains of streptococci of various origins against 8 different sera, found with this reaction that the immune sera prepared from scarlet fever streptococci gave a complement fixation with all the scarlet fever strains, while he always obtained negative results with the strains of all pyogenic streptococci; and this with only the exception of one strain isolated from a subperiosteal abscess and of another strain isolated from a case of pleurisy, in which case, however, the reaction was weakly positive. Recently, Friedman, Heymann and Abraham,[8] using the same reaction and working with the sera of rabbits immunized with the 4 types of English scarlet fever streptococci (MacCartney), had to conclude that a differentiation of the 4 types of streptococci had not given them satisfactory results. Each of the 4 strains gave a complement fixation with each immune serum. Sera II and IV did not prove to be specific for scarlet fever, both giving positive results even with strains of streptococci of different origin (sepsis, mastitis, diphtheria).

Cantacuzene and Bonciu,[4] using immune sera of animals (horses) hypervaccinated with the Dick toxin, obtained also negative results with this reaction, so that the authors see in this the failure of specificity of the complement fixation test and think that probably the results obtained with this reaction with sera of scarlet fever patients are likely due to physical modification of the blood during the attack of the disease.

As the majority of investigators, so far, have had uniformly negative results and only Andersen claims to have been successful, in fact in 100 per cent of his cases, this very striking difference in results led me to investigate the problem further, to ascertain whether the sera of rabbits immunized with strains of *S. hæmolyticus scarlatinæ* would give a clear complement fixation and if streptococci of various origin would behave in the same manner as the hæmolyticus; furthermore, to see whether watery extracts obtained from the organs (spleen, liver, heart) of such immunized animals would react in a manner similar to the immune sera.

TECHNIQUE

I worked with the same strains of *S. hæmolyticus scarlatinæ* used in the complement fixation reaction with the serum of scarlet fever patients. They were obtained from the American Type Culture Collection, Chicago. The medium of choice used for growing the streptococci was trypsinized broth, prepared according to the method of Capt. S. R. Douglas, and as adapted by R. H. Malone and L. J. Rhea.[17]

The various streptococci were grown in large flasks containing 250 c.c. and 500 c.c. of medium. After the growth had reached an optimum, *i.e.*, after the fourth or fifth day of incubation at 37° C., the medium was centrifugalized in large tubes and the final sediment was then washed 5 times with fresh sterile normal physiological salt solution. Each c.c. of sediment, as obtained in graduated conical tubes, and as the result of a 5-minute centrifugalization at a medium speed, was suspended in 5 c.c. of normal sterile NaCl solution. This suspension was shaken for 3 hours, then heated at 60° C. for 1 hour for 3 successive days after which it was kept in an

* From the Laboratory of the Shriners' Hospital for Crippled Children, Montreal Unit.

ice box. A second antigen, prepared also from the *S. hæmolyticus* in exactly the same way, was not subjected to heat, but 0.5 c.c. of a 1 per cent Ac. Carbolicum Liq. was added to every 50 c.c. of antigen. Antigens from other pyogenic streptococci were prepared in a similar way.

The heart, spleen and liver of rabbits immunized with *S. hæmolyticus* and rabbits immunized with *S. pyogenes* were obtained from the animals as soon as the blood had been collected. These organs, washed several times in NaCl solution, to free them from blood, were weighed. For each gram of organ, 5 c.c. of sterile NaCl solution was added. They were then finely minced, ground with sterile sand, and kept in the ice box for 12 hours. After this time, these extracts were centrifugalized at high speed, the supernatant fluid was pipetted into sterile test tubes and heated at 55° C. for 1 hour and then kept in the ice box.

The immune sera were obtained from strains of *S. hæmolyticus* and from strains of other streptococci (*S. erysipelatis, pyogenes*). These immune sera were first tested by means of the complement fixation with homologous antigens of both kinds (heated and not heated) and then with antigens of different streptococci. The amount of immune serum used was a fixed one of 0.1 c.c and this was tested against various amounts of antigen from 0.4 c.c. to 0.006 c.c. Then again a fixed amount of antigen, 0.2 c.c., was tested with various amounts of immune serum, from 0.5 c.c. to 0.05 c.c. The various antigens were also titrated against normal rabbit serum. The same method of titration was also used in testing the watery extracts obtained from organs of normal rabbits and from organs of rabbits immunized with strains of *S. hæmolyticus* and of streptococci of different origin.

In all, 24 strains of *S. hæmolyticus* were examined by means of the complement fixation; also 12 strains of various other streptococci, including those of erysipelas, endocarditis, puerperal fever, sore throat, etc. Five immune sera were obtained from the *S. hæmolyticus* and 3 from pyogenic streptococci.

The hæmolytic system used consisted of fresh guinea pig serum, 10 per cent; antisheep hæmolytic serum according to the dose; and sheep's cells, 5 per cent suspension. Three minimal hæmolytic doses were used, the test being done in half doses.

Rabbit immunization.—Large healthy rabbits weighing, on an average, 5 lbs., were immunized with steady doses of the heated antigens only (previously tested culturally for their sterility), giving 2 c.c. intravenously every 3rd day. The serum of the rabbits, after the 8th dose, was tested for its fixing powers, but, unfortunately, without obtaining any proof of the test. The immunization was carried on until the 10th injection, and after the ordinary lapse of time following the last injection the rabbits were sacrificed and the blood collected in sterile flasks. The day after, the serum was separated, inactivated, and placed in the ice box.

RESULTS

In all the tests carried out by me, I did not obtain a definite complement fixation with the immune sera. This applies to antigens prepared from strains of *S. hæmolyticus* and its immune serum, to all the various antigens and immune sera obtained from other strains of streptococci, and to watery extracts of the spleen, liver and heart. Thus it appears that this serological test, which has been of such capital importance in deciding the etiology of the infection in other pathological conditions, fails in scarlet fever.

As I have said, the only author, so far, who has succeeded in obtaining 100 per cent positive results with this test is Andersen, and his results are probably due to some variation of the technique usually followed by other authors. No doubt, the results obtained by him are more than extraordinary. The 61 strains isolated by him from scarlet fever patients all reacted with 8 homologous immune sera, while the 27 strains of streptococci of different origin all gave a negative result. The negative results obtained by George,[9] by Friedmann, Heymann and Abraham[8] and by the author fail to give confirmatory evidence of his findings.

The distinctly opposite results with the complement fixation reaction with the sera of patients convalescent from scarlet fever, obtained by the majority of investigators in various countries (Foix and Mallein,[6] Livierato,[15] Schleissner,[20] Cantacuzene and Bonciu,[4] Green,[10] Friedmann, Heymann and Abraham,[8] and Langer[16] (who, working with carbolized antigens obtained positive results in 90 per cent

of his cases), as against Besredka and Dopter[2] and Bürgers and Wohlfeil,[3] seem to me to give a striking proof of the indisputable value of this reaction in scarlet fever. Although we cannot, so far, claim that an absolute classification of the different types of streptococci is possible, yet, a plausible differentiation among the streptococci of scarlet fever has been reached by means of this reaction, which differentiation seems to be well in accordance with the morphological, cultural and other immunological characters of this particular microörganism.

The lack of response as regards this reaction to immune sera and, to some extent, to patients' sera, may be ascribed to numerous causes, such as, the individuality of the animal used in research, the preparation of the antigens, the method of titration or the identity of the streptococci of scarlet fever, which differences may be due to chemically different antigens (Lancefield[14]), possessing type, species or group-specific structures (Heidelberger[11]).

Whether the serological methods will ever give a clear solution of this intricate and important problem of the *S. hæmolyticus* being the cause of scarlet fever is the question at present discussed in all schools, as is evident from the extensive literature on the subject. In my opinion, however, although, so far, the results obtained with the immune sera have not been at all favourable, with further researches and betterment of technique the problem will be solved. The claims of Mandelbaum[18] for his bacillus and of Herzberg[12] for his syzygiococcus as the causative agent of scarlet fever have so far not altered the opinion of those who for many years have accepted the *S. hæmolyticus scarlatinæ* as the agent. This opinion is based on facts which have been repeatedly emphasized and which, according to Friedmann, are the following:

1. By immunizing horses with the toxins of scarlet fever streptococci, a serum is obtained which heals scarlet fever in a short time, and in a specific way gives the blanching phenomenon of Schultz-Charlton.

2. By immunization with the scarlet fever streptococci or its toxins an active immunity is produced against scarlet fever.

3. With the filtrates of the scarlet fever streptococci, a skin reaction is produced (Dick test), which, similar to the Schick test in diphtheria, seems to show a tendency to scarlet fever susceptibility.

4. By injecting large quantities of streptococcic toxins all the symptoms of an acute scarlet fever are produced, the so-produced exanthem being made to disappear by means of the convalescent serum.

5. In fresh scarlet fever patients, in nearly 100 per cent of the cases, the *S. hæmolyticus* is found in the throat.

Moreover, the direct experiments of the Dicks,[5] by painting the tonsils of healthy persons with pure broth cultures of *S. hæmolyticus* have produced typical scarlet fever in 48 hours. Nicolle, Conseil and Durand,[19] in a healthy person, injected a drop of culture of streptococci isolated from a patient in the acute stage of scarlet fever and grown on artificial media as far as the fourth passage, and obtained a typical scarlet fever with incubation, high fever, exanthem, and classic desquamation. We find in recent literature, with Schottmüller[21] and Friedmann,[7] other direct instances in which the *S. scarlatinæ* seems to have played a great part.

In Park's laboratory, a lady assistant developed typical scarlet fever 48 hours after she had aspirated a pure culture of scarlet fever streptococci. Again, in November, 1901, in the Pasteur Institute in Warsaw, 43 people were vaccinated against rabies. Of these, 3 children were taken suddenly ill with toxic symptoms; 5 suffered with an infection of aseptic type; 11 had mild general symptoms with local scarlet fever-like exanthem; 3 developed typical scarlet; 21 remained free of infection and in 12 of these it was found that they had already had scarlet fever. From the spinal cord of the rabbit used for immunization, pure cultures of streptococci were isolated. It was afterwards proved that the rabbits which had been supplying the fixed virus for rabies had been previously treated with streptococci which originated from the corpse of a child who had died from scarlet fever.

For the first observations in this field and the discovery of the *S. scarlatinæ* we are indebted to Klein[13] who already, in 1885, traced an epidemic of scarlet fever to this streptococcus. He says: "The streptococcus which I cultivated in a certain percentage of cases of scarlatina from the blood of patients during the acute febrile stage belongs to this group; when injected into rodents, it produces, in a large per-

centage, acute septicæmic infection. . . . The same streptococcus was found in connection with an eruptive (ulcerative) disease of the teats and udder of milch cows at Hendon in 1886, to the consumption of whose milk an extensive outbreak of scarlet fever in the north of London was definitely traced."

Bürgers and Wohlfeil,[8] who also failed with the complement fixation in differentiating the type of streptococcus causing scarlet fever, very sharply criticize the theory of this being the etiological factor. They argue mainly that they do not consider the wonderful results obtained with the immune serum a definite proof of the streptococcus being the cause of scarlet fever; they deny any value to the experiments of the Dicks; and they are inclined, with Schottmüller,[21] to support the theory that scarlet fever is caused by a particular virus which lives in symbiosis with the *S. hæmolyticus*.

In marked contrast to this, Friedmann[7] at the Scarlet Fever Congress in Könisberg, in 1928, reiterated that: "Owing to the regular presence of complement fixing antibodies against streptococci in the serum of convalescents from scarlet fever, together with all the other findings, it is no wonder that the streptococcic etiology of scarlet fever is recognized without reserve."

I wish to extend my thanks to Dr. L. J. Rhea for his valuable suggestions and assistance in this research.

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BISMUTH SUBNITRATE IN TREATMENT OF ARTERIAL HYPERTENSION.—It has long been known that nitrites (NO_2-) cause vascular relaxation. The soluble nitrites, amyl nitrite, glyceryl trinitrate, sodium nitrite and erythrol tetranitrate, cause violet and transient arterial relaxation. But the very violence and fleeting character of this relaxation make these substances unfit for therapeutic administration in arterial hypertension, except in acute vascular emergencies as in angina pectoris or cerebral arterial spasm. A slowly soluble, slowly absorbed nitrite, liberating the nitrite ion (NO_2-) into the blood stream continuously in small amounts, is therefore highly desirable. Such a substance is bismuth subnitrate. Edward J. Stieglitz has used this nitrate in the therapy of hypertension for the last five years with excellent therapeutic results. In the bowel the bismuth subnitrate is slowly decomposed, liberating nitrate ions (NO_3-). The nitrate (NO_3-) is reduced by *Bacillus coli* to nitrous acid. Thus minute quantities of nitrite ions are continuously absorbed, as the low solubility of the original salt maintains a persistent repository. During and following the administration of 10 grains (0.65 Gm.) of bismuth subnitrate thrice daily amounts of nitrite ions are detectable in the urine. Gradual, gentle, persistent vascular relaxation and reduction of the arterial tension occurs. Nitrate ions also have the property of being diuretic and causing a profuse chloride diuresis. A small but definite reduction of the chloride content of the blood occurs during therapy with bismuth subnitrate. It is questionable, however, whether the blood chloride content affects the arterial tension to any notable degree. Bismuth is also mildly diuretic. No manifestations of intoxication have been observed. In 200 consecutive unselected cases of arterial tension the average improvement for the whole series was 60 per cent for the systolic hypertension and 83 per cent for the diastolic hypertension. This method of therapy is of especial value in those instances of arterial disease in which extensive sclerotic changes have not as yet occurred. In several instances in which the arterial tension was known to exceed 190 systolic and 115 diastolic for three years or more prior to bismuth subnitrate therapy, the tension has remained below 135 systolic and 85 diastolic for from three to four years after cessation of all medication, in patients ranging from 37 to 70 years of age. One should not anticipate good results from such therapy in situations in which actively operating etiological factors are neglected as, for example, oral sepsis or grossly injurious dietary habits. Extensive arteriolar sclerosis precludes any extensive improvement. Extensive impairment of the renal functional efficiency or renal reserve likewise inhibits good results. The drug is, however, of great assistance in reducing the cardiac burden in arterial hypertension. There do not seem to be any contraindications.—*J. Am. M. Ass.* **95:** 842, 1930.

SILICOSIS*

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SILICOSIS is purely an industrial disease, affecting the lungs of persons whose occupations expose them over long periods to the dust of hard rock. The disease has received a great deal of attention in Africa, where for many years it has been a serious economical problem in the mining industries. The South African Institute of Medical Research and the Miners' Phthisis Bureau of Johannesburg have published the most important contributions to the literature on the subject, and much of our knowledge of the disease is derived from this source. The largest silicotic community in America centres around the granite-cutting industry of the New England States, and to the investigators in this field we are also indebted for much valuable information.

Silicosis became a public health problem in Ontario only within the last six years. The first case was compensated in 1924, on the medical evidence of Dr. C. D. Parfitt. In the same year Dr. J. H. Elliott published the first Canadian contribution to the study of the disease. His report dealt with a survey of the Porcupine mines made at the request of the Ontario Government. The examination was limited to 11 men who had worked underground continuously for five years or more in the same area. Four of them were found to have definite silicosis; an additional 5 presented evidence of early fibrosis; only 2 were considered entirely free from lung involvement. Dr. Elliott's investigations established the presence of definite health hazards in the gold mines of Ontario. As a result, the Provincial Department of Health quickly assumed a lively interest in the matter, and organized surveys of all the important mining camps. Diagnostic clinics were established, means of preventing the disease instituted, and the mechanism of compensation set in motion. Up to January of this year 182 miners have been granted benefits by the Workmen's Compensation Board, on the grounds of total or partial disability from silicosis. In addition, a few granite cutters and others employed in various hazardous trades other than mining have received compensation for the same condition.

With an ever-increasing number of cases under clinical observation, autopsy material has, from time to time, been available for laboratory study. In the Department of Pathology of the University of Toronto, we have had the opportunity of examining the lungs of some 17 proved cases. The majority of these were handed over to us by Dr. A. R. Riddell, of the Department of Health, and to him belongs the credit for obtaining the autopsies. Under the direction of Prof. Oskar Klotz these cases have been studied from the pathological point of view, and the present communication is mainly concerned with the pathological findings.

Certain general considerations must, however, be taken into account in order to obtain an accurate appreciation of the nature of the disease. In the first place, it is important to realize that silicosis is by far the most serious type of dust disease met with. It stands by itself when compared with the less serious conditions produced by coal or iron dust. Indeed, many authors believe there is really no such disease as anthracosis or siderosis; that when appreciable fibrosis appears in the lung associated with dust inhalation, it is always due to silica. But, whether this be true or not, it is evident that the injury induced by other dusts is trivial compared with that due to silica.

One must bear in mind, too, that silicosis is characterized by an extreme chronicity. It never develops in less than four years' exposure, and massive inhalations are necessary to produce it in so short a time. If the dust risk is not intense more than twenty years of

* Read at the meeting of the Ontario Medical Association, Toronto, May, 1930.

exposure may be endured before the characteristic lesions develop. The reserve power of the respiratory system to take care of inhaled dust particles is enormous, and it is only when the natural resources are taxed to the utmost that injury supervenes.

The disease runs entirely to fibrosis of the lung. So far as is known, no other part of the body is directly affected. It is a disease, which, in its uncomplicated form, practically never of itself causes death. Even in a pronounced case the affected person may appear robust, feel well, and be able to work, except that he gets rapidly out of breath on exertion. None the less, silicosis is a very serious affection because it renders the victim particularly vulnerable to pulmonary infections.

The offending dust is of one variety only, namely that containing appreciable quantities of free silica. In order to produce its deadly effect, silica must be present in uncombined SiO_2; if it exists as a silicate, *e.g.*, in clays, shale, slate, or limestone, the dust is not harmful. Silica is a crystalline substance, one of the hardest compounds of the element silicon, and it constitutes a large part of all hard rock. Quartz is made up almost entirely of free silica. Thus, any industry which has to do with the fracture of hard rock is a hazardous trade from the standpoint of silicosis. When fractured the rock liberates myriads of tiny fragments which float about in the air. The smaller the fragments the more harmful they are to the lung; in fact the whole of the mischief is caused by particles under 10 microns in size. It is very difficult to control such fine dust. Even under the most favourable conditions with sprinkling and running water the dust escapes into the air in an invisible form.

Chemically, silica is rather inert. It is insoluble in water and in all the acids except hydrofluoric. It can be dissolved by boiling the pulverized form in alkalies, for example, sodium carbonate solution, and this is how water-glass is made.

It has never been determined why silica alone, of all the inorganic trade dusts, should produce such a serious pathological condition of the lungs. Many theories have been advanced to explain its pathogenicity. Obviously, the fibrosis is something more than a foreign body reaction. The earlier workers considered that silica produced a mechanical injury in the lungs by virtue of the hardness and sharpness of its fragments. Plugging of the lymphatic vessels of the lung by dust-laden cells has been held by some authors to be the reason for fibrosis. The South African workers believe that the silica, when ingested by phagocytes, takes on the fixative properties of water-glass and virtually mummifies the dust-laden cells, thus giving rise to fibrotic induration. A more modern view is that particulate silica undergoes a slow change in the pulmonary tissues, becoming slowly converted into a toxic substance which by chronic irritation produces a fibrous response. There is some experimental evidence to show that certain compounds of silica are protoplasmic poisons, and it is considered likely that the tissue juices may so act upon silica dust within the lung as to slowly produce such a toxic substance. Histological evidence bears out this conception. Recent dust collections seen under the microscope contain an abundance of visible silica particles, but in the older deposits where fibrosis is under way, the fragments disappear. It only remains to conjecture that slow dissolution of the siliceous particles is coincident with the development of fibrosis.

This conception of the pathogenesis of silicosis has an important theoretical bearing on the clinical progress of the disease, for it follows that silicosis must be progressive after a man leaves his dusty occupation, for the reason that much unaltered silica is already fixed in his lung, and it will continue to stimulate slow fibrosis for a long time. Dr. J. G. Cunningham tells me this theory is borne out in practice. Many cases progress markedly after retiring from the hazardous trades.

So much for the consideration of uncomplicated silicosis. There remains the all-important matter of the relationship between it and tuberculosis, which we may now discuss briefly.

The majority of sufferers from silicosis eventually develop tuberculous infection of the lungs, and the combination almost always proves rapidly fatal. The mortality from phthisis amongst hard rock miners and granite cutters is strikingly high. Eleven of the 17 cases we have examined died of tuberculous bronchopneumonia or miliary tuberculosis, primary in the lung.

It is only in the experimental field that one can hope to explain the unfortunate vulnerability of silicotic tissue to tuberculous infection, but unhappily researches in this direction have shed little light on the problem. It is known that silica does not stimulate the growth of tubercle bacilli *in vitro*, but *in vivo* tuberculous infection is profoundly influenced by the presence of silica. The infection runs wild and the organisms multiply inordinately, but the reason for this is a complete mystery. Some authorities believe that the silica, by exerting a toxic action, shrouds the colonies of bacilli in a protective medium of devitalized tissue into which phagocytes do not readily penetrate. Others believe silica *in vivo* acts as a specific stimulus to the reproduction of tubercle bacilli. A very recent theory postulates that silica, by virtue of its colloidal properties, absorbs antibodies and so prevents the organisms from being attacked.

Our examinations tend to show that it is not the fibrosis of silicotic lungs which favours a tuberculous infection, but simply the presence of siliceous dust. Fibrotic tissue is naturally inimical to tuberculosis and seldom are the indurated portions of lung attacked by the infective process. Three of our cases were in the early stages of silicosis, having considerable dust in their lungs, but with no appreciable fibrosis; these three died, each with a massive bilateral caseous involvement, and there is little doubt but that the silica was in some strange way contributory to the fatal outcome.

If there is much fibrosis present when tuberculosis becomes superimposed, the reaction to the infection takes the form of widespread connective-tissue proliferation, which leads to massive induration, almost like an irregular fibroid tumour growth. If, on the other hand, infection takes place early in relation to the pneumokoniosis, caseation is the rule. From the radiologist's point of view, it is often very difficult to determine if and when tuberculosis has become superimposed on a silicotic lung. In this regard, autopsy findings may facilitate the interpretation of the roentgenogram. The lesion of simple silicosis runs to a finely nodular type of fibrosis, involving both lungs more or less uniformly and symmetrically. When, therefore, the x-ray shadows indicate that the nodules are matting together into irregular, symmetrical areas of induration, this may be taken as certain evidence of an infective process.

In consideration of the relationship between silica and tuberculous infection, it is interesting to speculate as to whether silica, which is a ubiquitous substance, may not play a part in the etiology of tuberculosis in the ordinary walks of life.

TREATMENT OF SEA-SICKNESS.—P. Vogt-Moller has studied the problem of sea-sickness during twenty-four crossings of the Atlantic in 1928 and 1929. He found that more than three-quarters of his patients were women, whose sea-sickness was more severe and protracted, as a rule, than that of the male patients. The best purely mechanical device proved to be keeping them as near to the centre of the ship as possible, since at this point the movements of the ship were less than anywhere else. The drugs tested were morphine, veronal and its derivatives, bromine salts, adrenaline, cocaine (used as a local anæsthetic for the stomach), strychnine, camphor, caffeine, chlorotone, benzyl-benzoate, sodium nitrite, and atropine. Neither the severity nor the duration of the sea-sickness was influenced by any of the drugs in this list when they were swallowed; even atropine by the mouth proved quite ineffective, though it had some effect when given by subcutaneous injection. The combination found most successfuly was a 0.1 per cent solution of atropine sulphate with a 0.1 per cent solution of scopolamine bromide, given subcutaneously or in suppositories. The dose of the atropine was from 0.5 to 1.25 mg., and that of the scopolamine from 0.25 to 0.5 mg.; no ill effects other than slight dryness of the mouth, easily relieved by water, were observed. Even when the temperature of the air was tropical there were no discomforts from interference with the secretion of sweat. Although the results of this treatment were described as amazingly good, the effects of a single injection or suppository were not necessarily immediate, but after three or four injections, distributed over a couple of days, most of the patients could leave their berths and felt well. In severe cases the average duration of the sea-sickness was reduced by three days by this treatment. In many cases only one or two injections or suppositories were necessary in order to restore the patients to a complete sense of well-being, even though the sea remained rough.—*Ugeskrift for Laeger*, p. 700, July 17, 1930.

PREGNANCY COMPLICATED BY HEART DISEASE AND TUBERCULOSIS*

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FROM the point of view of the obstetrician heart disease is of importance because it forms one of that trinity of causes of the extremely high maternal mortality rate in this country, the other two being toxæmia and infection. It cannot, however, be properly classed as a preventable disease, because as a rule its existence antedates the pregnancy, and consequently throws on the obstetrician the added responsibility of watching an abnormal heart throughout the whole period of gestation, as well as that of giving the ordinary necessary prenatal care.

It is a matter of common knowledge that the heart does extra work during pregnancy, but this it is quite capable of doing without showing any ill effects, provided it has the reserve energy of the normal heart. If, however, for any reason the threshold of reserve energy is lowered, then the added strain of pregnancy may result in heart failure. It is important, therefore, whenever a heart lesion is known to exist, to determine both its cause and its nature, and to determine whether it is of long standing, purely valvular, with no muscular involvement, and with compensation well established, or whether it is progressive, and whether there is any impairment of the heart muscle itself. In our experience, when such impairment exists, the most common condition found is mitral stenosis. This is the most serious of the valvular affections for several reasons; first, because of its insidious onset, more than 30 per cent of such cases giving no history of previous disease; secondly, because of its greater tendency to produce thrombosis, emboli and acute pulmonary œdema; thirdly, because it is usually progressive and leads to myocardial involvement and early death, comparatively few cases lasting beyond middle adult life.

Since heart disease when it does exist, almost invariably antedates the pregnancy, it must be considered the major condition, and treatment must be directed towards maintaining and preserving the normal function of the heart, with the pregnancy a secondary consideration. It is of the greatest importance, however, that constant prenatal supervision should be maintained throughout the whole of gestation, and that particular attention be paid to diet, rest and exercise.

Our efforts should be directed towards securing for our patient that treatment which will give the maximum of benefit with the minimum of risk. This treatment varies with the degree of involvement of the myocardium and the stage at which the patient comes under observation. If the heart muscle is not involved all that the patient needs is careful watching throughout the pregnancy, in order to make sure that her response to effort is good. No exercise, except the daily round of household duties, is necessary in order to measure the efficiency of the heart. If it stands up under this then it is efficient, and as a rule the heart that can stand the strain of pregnancy can stand the strain of labour. Labour may, therefore, be allowed to proceed normally during the first stage, but if there are any signs of cardiac embarrassment the second stage should be shortened by means of episiotomy and mid-forceps extraction. When there is non-engagement of the head due to contracted pelvis or abnormal position Cæsarean section should be done. In such cases the high forceps should never be used as its use involves injury to the child, and mutilation and shock to the mother.

When there is commencing involvement of the heart muscle, the patient should be put to bed and kept absolutely at rest until all signs of heart failure disappear. In these mild cases one must consider the probability of getting a living child, provided that the mother's life is not endangered by so doing. One should, therefore, carry the mother carefully along until the child is viable and as near term as possible, and then do a Cæsarean section. At the same time sterilization of the mother should be done, if

* Read at the fiftieth annual meeting of the Ontario Medical Association, May, 1930.

husband and wife agree. If, however, the heart failure progresses in spite of treatment then the pregnancy should be terminated at once and the patient sterilized.

When there are signs of extensive myocardial involvement, such as orthopnea, cyanosis, œdema, fibrillation, enlargement of the liver, it is advisable to do a venesection in order to give temporary relief to the embarrassed heart, and to terminate the pregnancy by Cæsarean section as soon afterwards as possible. Whenever a Cæsarean section is decided upon it is advisable to give a preliminary dose of morphine sulphate, gr. 1/6, combined with atropine sulphate, gr. 1/200, half an hour before operation, the morphine being valuable as a heart stimulant as well as a sedative, and the atropine tending to check the flow of bronchial secretion. The anæsthetic of choice is the one which will cause the least cardiac embarrassment and supply the greatest amount of oxygen. Accordingly ether combined with oxygen, administered by a trained anæsthetist, will give the best results.

Regarding the operation itself, the classical incision is preferable to the low because it can be done in shorter time and gives a better opportunity for sterilization, which should be done at the same time. There are two methods of operative procedure which in my experience are of value; one, before the viability of the child, when a subtotal hysterectomy should be done without opening the uterus; and second, after the child is viable, when the uterus should first be opened and the child removed, after which a subtotal hysterectomy should be done. The whole operation should not take more than twenty minutes.

The post-operative treatment should be directed towards combating the shock and preventing abdominal distension. In these cases the mother should not be allowed to nurse the baby until after the fifth day and in severe cases not at all. Our treatment consists of intravenous or interstitial saline, 1,000 c.c., started immediately after operation and continued as required, the patient lying flat or in Fowler's position according to the degree of dyspnœa present. Moist heat is applied to the abdomen constantly for three days, and pituitrin 1 c.c. combined with eserin gr. 1/50 is given every four hours for the first day in order to control post-operative distension. Morphine, gr. 1/4, combined with atropine, gr. 1/150, is also given for the relief of pain. A daily enema is necessary for the first three days, and should be given fifteen minutes after the administration of the pituitrin and eserin in order to produce the best results.

The prognosis varies with the nature and severity of the lesion. When there is no involvement of the heart muscle the prognosis is good, pregnancy and labour leaving no ill effects. When there is slight damage to the myocardium immediate recovery is to be expected, but each succeeding pregnancy adds to the damage already done and the life expectancy is shortened, while in cases of severe myocardial involvement the prognosis is extremely bad. Accordingly, when marked myocardial weakness is discovered in a young woman seeking advice she should be advised against marriage; if already married she should be advised against pregnancy; and if she is already pregnant she should be told of its dangers and given appropriate treatment. But heart murmurs of themselves should not be considered a bar to marriage. Finally, when heart disease complicates pregnancy one cannot emphasize too strongly the necessity for unceasing watchfulness on the part of the practitioner, faithful coöperation on the part of the patient, and intelligent interference when signs of trouble appear.

Regarding the pulmonary complications of pregnancy as a general rule it is wise to treat the major condition without regard to the pregnancy itself, until it is evident that the latter is known to cause increased cardiac or pulmonary embarrassment, when a termination of the pregnancy may be considered advisable. Exception may be taken to this rule in pulmonary tuberculosis, but the treatment in such cases in our opinion depends not so much on the extent of the lesion itself as on its activity or quiescence. When one is dealing with pregnancy in a tuberculous patient whose lesion is quiescent or cured, the treatment should be that of watchful expectancy throughout, a policy of non-interference being the safest line of procedure.

When an active lesion exists there seems to be no difference of opinion as to the wisest thing to do in the first trimester of the pregnancy, that is, before the formation of the placenta. During this stage the uterus should be emptied, either under morphine, sodium amytal analgesia, or gas-oxygen anæsthesia. When, however, the patient

has entered the second or third trimester of her pregnancy there is a difference of opinion as to the advisability of interfering, the prognosis being grave no matter which course is followed. It is in our opinion, however, safer for the patient to let the pregnancy proceed to its termination normally, but to shorten the second stage by means of pituitrin or forceps and episiotomy, or a combination of these aids, or to do a Cæsarean section under local anæsthesia.

In the presence of active and progressive tuberculosis there is a great danger of being stampeded into terminating the pregnancy in the vain hope of remedying a condition for which the pregnancy may not be responsible. For such cases institutional treatment is imperative, and as a rule it will produce more favourable results than the interruption of the pregnancy.

In conclusion I would say that whenever an active lesion is present in an unmarried woman, advise against marriage; when the patient is already married, advise against pregnancy; when pregnancy exists in the earlier months, advise its termination; when it has passed the first trimester, watch and pray.

SPECIAL FEEDING METHODS FOR INFANTS*

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IT is rather unfortunate for me that the request for a paper on special methods in infant feeding has come about fifteen years too late. Fifteen years or so ago one might truly have done justice to such a thesis, because special methods abounded, and there was, therefore, much to be said. To-day, special methods have so dwindled, to be replaced by a simple, rational, and almost universal feeding system, that the necessity for their use scarcely arises in the infant rationally fed from the beginning, and, therefore, comparatively little remains to be said about them.

Several factors have contributed to bring about this change; the boiling of milk, which is now all but universal; a greater liberality in the amount of food, based on a better knowledge of the needs of the infant; the acidification of milk, allowing larger quantities to be given to very young infants; and the realization of the importance of the accessory food factors. All these together have lessened the number of our difficult feeding problems. Weaning, either in summer or winter, has lost its terrors, and diarrhœal diseases in summertime are far less frequent than they were, due in part to the improved nutritional state of most infants by the time that season is reached.

The so-called difficult feeding problems thus are reduced to a now comparatively small group relating to: (1) infants with various forms of food intolerance, or indigestion; (2) infants with organic disorders, notably pyloric stenosis; (3) constitutionally small children with anorexia; (4) a small group of infants with a very mild form of myatonia (often mistaken for rickets); (5) athreptic infants; (6) infants with various forms of infections, enteral and parenteral.

The first group was once far more common than it is to-day, when top milk is no longer in vogue, for fat intolerance is perhaps by far the most common of these types. Occasionally even now one does see an infant who is constipated, who does not gain, and who vomits small quantities for long intervals after a feeding. No special method of feeding is called for here, except partially skimming the milk, and lengthening the interval between feedings. Sugar intolerance is rare in the amounts usually given, but often there are indications for changing the type of sugar. Malt sugars should not be given to vomiting infants, where a change to lactose or cane sugar is often beneficial. Protein intolerance was once quite a popular form of disturbance in the whey and cream period of infant feeding, but protein intolerance is now entirely out of fashion, and until this form of complaint regains its former prominence, it is hardly worth

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while devoting any time to a discussion of it.

In the second group, of gastric and intestinal pathological conditions, pyloric stenosis and its medical treatment deserves a thought in passing. It must be remembered that a well chosen and carefully handled case of pyloric stenosis can be successfully cared for medically. One occasionally sees an infant with pyloric stenosis, in the first few days after typical symptoms have developed, before a great deal of weight has been lost. Here, a rational trial with medical treatment is indicated, *always provided that the infant does well on it from the start.* It does not do to try such medical treatment for a week or two, playing a losing game all the while, until the infant becomes a poor or hopeless surgical risk. The infant must improve from the very beginning of treatment, or be at once transferred to the surgeon. Having this point clearly in mind, the use of thick feeding will often prove a boon. The thick food given consists of a wheat cereal, such as farina or cream of wheat, cooked with the quantity of milk allowed into a thick mass, divided into five or six portions, and fed to the infant from a spoon at four hourly intervals. This may be fed to very young infants, and, if retained, will make the child gain. Thick feeding of this type may also be used in children with persistent vomiting from other causes, and in rumination. In fact, in the latter condition, it has been the only treatment that has ever met with success in my hands.

The group of mild myatonic infants can be recognized by the diminished muscular tone, evidenced especially in the hyper-extensibility of the feet, so that the toes can be easily made to touch the anterior surfaces of the legs. The voice is usually husky, and frequently there is retraction of the lower end of the sternum on inspiration, increased by crying. They are almost invariably small children, who fail to gain well on any food mixtures. They are spoken of here merely to emphasize the futility of attempting special methods in this type of case. It is well to realize our limitations.

The same is true of another group, the constitutionally small children, with a family history of other small children, who have fair or small appetites, who gain very slowly, but who, despite this, are firm and even fat. This is the type of baby who, though weighing a paltry fifteen or sixteen pounds at one year of age, will put his neighbours to shame by walking at the age of 10 months, and so furnish his mother with at least one talking point. Here too, special feeding methods will avail nothing.

We have then to discuss the athreptic infant, and the applicability of special methods of feeding in his case. In a previous communication[1] I have drawn attention to the fact that by far the greatest number of athreptic infants are underfed. This, of course, is exclusive of children who are athreptic as a result of prolonged enteral or parenteral infections. This group deserves separate consideration. Generally speaking, it may be safely said that the majority of infants brought for failure to thrive merely require an increase in their food. The food offered, in addition to being thoroughly digestible, must provide a sufficiency for activity and growth. The requisite in the case of the athreptic infant is that the food must enable him not only to gain in weight, but also to make up his arrears. We cannot be content with merely fulfilling the theoretic caloric requirements of a normal infant of similar weight; the amount given must supply the expected weight of the infant. Bearing this fact in mind, and that this food must be contained in the bulk which the infant is able to take, the problem of feeding in athrepsia resolves itself into a problem of adequately concentrating a food mixture. Whatever special methods we may have at our disposal, all strive for the same goal.

The best known method of attaining this end is, of course, sour milk feeding. With acidified milk we are able to feed whole milk even to young infants. The addition of carbohydrate to this, materially enhances the caloric value of such a food. Whole lactic acid milk, with 5 per cent additional carbohydrate, usually in the form of corn syrup, is by now, thanks to Marriott, too well known as a feeding method to require more than mention. Its chief value lies in the ability of a very young, or even feeble, infant to digest a food so concentrated, and as such it is a boon. Not long ago Dr. H. P. Wright[2] beautifully demonstrated the value of just such a food as the sole formula for a large group of institutional children. The food was given *ad libitum* for not longer than twenty minutes, every four hours, five feedings.

per day. The uniformly excellent nutritional state of these infants, some of them athreptic at first, and their freedom from nutritional disorders, is the highest commendation for this type of feeding, and in most instances it is adequate in healthy and athreptic infants alike. Nelson[3] has also demonstrated how uniformly well infants will thrive on acidified whole milk with corn syrup. She showed that such infants gained more rapidly in weight and height and showed a greater nitrogen retention than those fed on ordinary milk mixtures.

There are other methods, equally useful, which, however, deserve discussion. Evaporated milk, for instance, possesses many advantages in infant feeding generally. It is often better tolerated than whole milk by delicate infants, and it has the advantage of concentration, so that with the addition of lactic acid, it can be given in a strength greater than whole milk itself, when the amount of milk needed by the infant is greater than the amount of milk he would take as whole milk. For instance, an infant requires say twenty ounces of whole milk per day, but he will only take a total quantity of seventeen ounces of food in twenty-four hours. Ten ounces of evaporated milk will be equivalent to twenty ounces of whole milk, the addition of seven ounces of water will make up the quantity which he will take, and the addition of carbohydrate in adequate quantity will complete the caloric requirements. Lactic acid, or lemon or orange juice, may be used for acidifying, and the infant will have an adequate amount of food in the small bulk which he is willing or able to consume. Many infants with small appetites have been brought along by such a method.

Sweetened condensed milk has, in times past, been anathematized by some in pædiatrics. It has borne the brunt of the scorn of most of us. Most of this opprobrium was caused by our own inability to fully appreciate the necessity of supplying the accessory factors together with whatever foods we were giving to infants. Raw milk was considered essential, and when we did not give raw milk, we neglected to supply the deficiences in the cooked milk. Hence our stubborn disdain of pasteurized, boiled and evaporated milks as infant feeding materials. However, with the systematic addition of orange juice and cod liver oil to all infant diets, condensed milk may now be admitted again into the fold of respectable infant foods. It is, after all, only evaporated milk with cane sugar added, and as such, while it can scarcely be termed an ideal infant food, it still can be said to have its realm of usefulness which we would do well to recognize. It makes a very useful supplemental feeding for a nursing infant, but more than this, it is often better tolerated by feeble premature infants than any other food. In the strength of one teaspoonful per ounce of water it may be fed either alone or with part breast milk, when this is available. Calcium caseinate may be added in order to increase the protein content, and as such may be used successfully during the entire first year of life, provided, of course, that the accessory factors are also liberally supplied.

Protein milk is commonly used in diarrhœa. It is an incomplete food, since it is very low in carbohydrate. It is probably not generally realized that with the addition of sufficient carbohydrate, protein milk can be a perfectly useful food mixture. One is often confronted with an infant holding its own on protein milk after an exhausting battle with severe diarrhœa. The thought of making food changes strikes fear into one's heart, and the temptation to let well alone is often overpowering. We are content "to suffer those ills we have than to fly to others that we know not of." It is in such instances that the plan of gradually increasing quantities of carbohydrate becomes the welcome *deus ex machina*. Such a mixture may be used indefinitely with complete satisfaction.

A very useful and very frequently successful addition to a formula is the butter-soup mixture, described by Czerny and Kleinschmidt,[4] or the modification of this formula which I described several years ago,[1] using equal parts of butter and cod liver oil instead of butter alone. The mixture is made by emulsifying butter, or butter and cod liver oil, with flour, sugar and water. Heating the butter is supposed to be an advantage, because the volatile fatty acids are driven off. An ounce of butter-soup, or butter-oil mixture, yields about thirty calories, so that if in any food mixture five ounces of water is replaced by five ounces of the mixture, an increase of 150 calories is obtained without any increase in bulk. Herein lies its greatest

advantage. It can be used in cases of simple athrepsia, due to underfeeding, where no gastric or intestinal derangement is present. Heating must certainly alter the butter in some way as to increase its digestibility, because no infant could tolerate an equivalent addition of cream to the formula, but can manage to take five or even ten ounces of butter-soup mixture very well. The gains recorded on such a feeding are sometimes phenomenal, a pound and more in a week is not at all unusual. A month or six weeks of such feeding will often transform the scrawny, athreptic infant into a firm, fat, and thriving one, and the reason for this change is merely that an adequacy of food in digestible form has been offered.

In this last, after all, lies the whole crux of most infant feeding problems, whether or not any special method be employed. There is a tragic tale in many infant feeding histories, which tells of frequent, almost daily, changes of food, each of which fails to fulfill the first and simplest law of nutrition problems, namely, to give the child what he needs. What good is it if we do employ all the special feeding methods in our armamentaria if we have failed to observe this simple rule? The apparently normal baby, properly fed at the outset, almost never becomes a feeding problem, unless, of course, he suffers from a definite pathological condition such as spasm or stenosis of the pylorus, or has an intolerance to fat or to cow's milk. The symptoms of all these conditions are clear enough, and the methods of treatment have now been long established. Therefore, the better we feed our normal infants, the less will be our need for special methods of feeding. In the present state of our knowledge of modern feeding methods, of requirements, and of the absolute necessity of supplying all the accessory factors in all cases, the existence of such an appalling number of athreptic infants is, I am afraid, a reflection upon ourselves. The knowledge of the need for accessory factors has finally permeated both lay and medical minds alike. It has captured the imagination of people. People think in terms of vitamins as once they thought in terms of calories, with the result that most children are not neglected on this score. Only the importance of giving cod liver oil indiscriminately to *all* infants, from birth to the end of the first year, has not yet gained sufficient prominence; but irradiated ergosterol, and glass which transmits ultra-violet light, such as vitaglass, and irradiated foodstuffs, are deservedly becoming increasingly popularised, so that one need have little fear of not supplying the D factor in one form or another. In the measure that this and the other vitamins are supplied will many of our infant feeding problems diminish and cease to be. Good, nay perfect, infant feeding should be the province of every practitioner, rather than the realm of the pædiatrist, and when the truth of the utter simplicity of infant feeding is finally brought home to every physician, special methods, except in rare and special instances, will no longer exist.

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INVESTIGATIONS WHETHER IODINE FED TO MILK-PRODUCING ANIMALS AS GALACTAGOGUE MAY BE HARMFUL FOR MILK CONSUMERS.—Maurer directs attention to reports in agricultural journals, which recommend an increase in the iodine content of the food of milk-producing animals, for the purpose of increasing the quantity as well as the fat content of the milk. The author thinks that an excessive amount of iodine in the milk might involve dangers for the consumers, especially for iodine susceptible persons in regions where goitre is endemic. He reviews the results of tests that have been conducted to determine the iodine content of milk from animals that have received food with an increased amount of iodine. It was found that the iodine content of such milk is not great enough to cause injurious effects in normal persons. However, for some susceptible persons the amount is excessive. In the conclusion the author stresses that physicians should bring this to the attention of the agricultural research institutes, and that the latter should make experiments to determine the minimum of iodine that will produce the galactagogue effect but will not bring into the milk quantities of iodine that would be harmful to susceptible persons.—*Münch. med. Wchnschr.* **77**: 895.

THE PROGNOSIS FOR A SEROLOGICAL CURE IN HEREDITARY SYPHILIS*

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THERE is probably no disease in the realm of pædiatrics in which the prognosis is beset with so many difficulties as in hereditary syphilis. The reason for this is obvious; there is at present no reliable standard by which a cure may be estimated. That a clinical cure, which is frequently attained shortly after treatment is instituted, is quite transient and unreliable is a fact with which you are all familiar. But the fact that a serological cure, *i.e.*, a negative Wassermann reaction which has remained negative for two years, is also not definite proof of a cure is not so generally known. I have seen children who have received apparently adequate treatment resulting in a permanently negative blood Wassermann test develop, in later years, mental deficiency or interstitial keratitis. Such cases, fortunately, are not common, but when they do occur, the question arises—"When is a cure not a cure?" Apart from the difficulty in finding a standard for estimating a cure there are many other factors which tend to make the prognosis difficult, such as the marked variation in resistance to treatment of different children, the duration of the disease before treatment is commenced, the willingness of the patient to enter whole-heartedly into the arduous routine of treatment, etc.

The prognosis of congenital syphilis, as gleaned from a study of current pædiatric literature, is an optimistic one. Such authorities on the subject as Veeder and Jeans state: "With the modern methods of treatment a persistently negative Wassermann reaction and freedom from symptoms has been *the rule* in our hands." After being in charge of a treatment clinic for eleven years, during which period approximately 500 cases have been observed and treatment carried out by what I consider modern methods, I cannot confess to the degree of optimism indicated by the above quotation. If the results of treatment recorded below compare unfavourably with those of other observers the fault cannot be attributed to the lack of co-operation of the patients themselves. Rarely has it been necessary to invoke the legal machinery provided to compel attendance at the clinic; the children as a rule come willingly and the follow-up work is efficiently and thoroughly carried out. The fault then, if there is one, lies with either the choice of treatment prescribed, the quality of the drugs used, or in the method of administration. The routine of treatment is, briefly, as follows: arsphenamin intravenously once a week for six weeks; mercury by inunction or by mouth, or by both methods, for a second six weeks.

This constitutes one course of treatment. The blood Wassermann test is then made and if it is positive the course is repeated again and again until a negative test is obtained, and this is followed by a final course. The mercurial treatment is given at home by the parent and the visiting nurse checks this as well as possible. It may, at times, be a weak link in the chain of treatment, but the intramuscular administration, bi-weekly, of mercury also has its disadvantages, in that the child does not get any respite or holiday from the clinic. A word will be said later on regarding the use of bismuth. Iodides are rarely used, but in selected cases are invaluable. The arsenical salt used at present is diarsenol, and in those cases which develop an immediate reaction to the preparation novarsan is used. In no instance have we given arsphenamin intramuscularly or by rectum.

In the following statistical study it will be observed that there is no mention of the number of deaths which occurred and this omission requires some explanation. The sole object of the study was to try and determine the frequency with which cases of congenital syphilis can be rendered Wassermann-negative. More than 90 per cent of the deaths in this disease occur in the first few months of life. The young infants

* Read at the annual meeting of the Canadian Society for the Study of Diseases of Children, Brockville, June 20, 1930.

with florid syphilis were admitted to the wards of the hospital. The mortality in these cases was about 25 per cent, and the fatal termination was not long delayed. Those surviving the acute florid stage were discharged for continuance of treatment in the out-patient clinic, and they then came under the scope of this paper. Such cases constitute only a small part of the total number selected for study. The majority are older children who, because of suspicious symptoms, have been referred directly to the special clinic by one of the other out-patient department clinics, or have been referred as contacts by an adult special treatment clinic. Only those children who have been under observation and treatment for a reasonable period have been included in this study.

The question may well be asked—"What constitutes a reasonable period of treatment?" In a previous communication, published in 1922, I attempted to define this and I shall quote from that article. "The average time required to produce a persistently negative Wassermann varies according to the stage of the disease when treatment is commenced. In the early stage an average of six months is required; in the latent stage eleven months; and in the tertiary stage sixteen and a half months. Thus, to obtain an accurate conception of our ability to cure the disease it is obvious that we must consider only those cases in the first, second and third stages which have been under treatment for six, eleven and sixteen and a half months respectively." In the present study I have increased the last figure to eighteen months.

Two hundred and seventy cases which have been under observation during the last eleven years were treated for the reasonable period indicated above, and an analysis of these comprises this report. As will be seen in the tables, the cases have been divided into three groups; the early stage, which includes the infants under one year of age; the latent stage, those between one and five years; and the late or tertiary stage, those over five years. Such a division is, of course, a rough one, and it must be understood that there is considerable overlapping.

Table I gives the results of treatment and the column showing the percentage of cures in the various stages is of special interest. A similar statistical study in 1923, after four years of treatment of these cases, showed the percentage of cures for the three stages to be 83, 36 and 24 per cent as against 80, 64 and 49 per cent in this study.

TABLE I

	No.	*Cured*		*Improved*		*Unimproved*	
			Per-centage		Per-centage		Per-centage
Early	75	60	80	4	5	11	15
Latent ...	33	21	64	7	21	5	15
Late	162	79	49	33	20	50	31
Total	270	160	59	44	16	66	25

The less favourable figures for the second and third stages in the 1923 report may be attributed to the smaller number of cases studied, and to the fact that, as the Wassermann in the cured cases had to be kept negative for two years before they were considered as actually cured, a minimum of two years was all that remained for the treatment. This was usually sufficient for the infants in the early stage, so the percentage of cures in this group is practically identical in the two studies, but later experience has shown that a considerably longer period of treatment is required to effect a cure in the latent and late stages. There is then, as the above table indicates, a very definite relationship between the prognosis and the age at which treatment is commenced. It cannot be too strongly emphasized that one's ability to effect a serological cure depends largely on the early recognition of the disease and early institution of treatment.

TABLE II

AVERAGE DURATION OF TREATMENT IN CURED CASES BEFORE FIRST NEGATIVE WASSERMANN WAS OBTAINED

Early	8.2 (5.8*)	mos.
Latent	22	mos.
Late	20	mos.

* Represents average after excluding the three Wassermann-fast cases.

Table II gives an idea of how long treatment must be administered in the average case before a negative Wassermann test may be expected. There were 60 cured cases in the early stage, and a negative test was secured in an average of 8.2 months. Three of the 60 cases were, however, Wassermann-fast and unusually resistant to treatment. Omitting these 3 cases, the average for the remaining 57 is only 5.8 months. In view of the fact that Wassermann-fast cases are relatively infrequent in this stage, I feel that the figure 5.8 is a fairer average. It is noteworthy that although a greater percentage of cases in the latent stage are rendered negative

than in the late stage the duration of treatment required is almost identical.

TABLE III

AVERAGE DURATION OF TREATMENT IN CURED CASES BEFORE FIRST PERM. NEGATIVE WASSERMANN WAS OBTAINED

Early	11.3 (7.5)*	mos.
Latent	28	mos.
Late	28	mos.

* Represents average after excluding the three Wassermann-fast cases.

Table III is self explanatory. One of the discouraging features of the treatment of this disease is that the first negative Wassermann test does not always remain negative. Lapses back to a positive or strongly positive test are quite common in the late stage (31 per cent of the cases), less common in the latent (15 per cent), and relatively infrequent in the early stage (4.5 per cent). A comparison of Table II and Table III shows that a longer average period of treatment is required to produce a permanently negative Wassermann test than is required to produce a permanently negative Wassermann test than is required to produce the first negative Wassermann. This increased period is three months in the early stage, six months in the latent, and eight months in the late stage.

TABLE IV

AVERAGE DURATION TREATMENT (in months)

	Cured	*Improved*	*Unimproved*
Early	13.2 (8.7)*	18	40
Latent	31	45	30
Late	34	43	40

* Represents average after excluding the three Wassermann-fast cases.

The average duration of treatment for all cases is shown in Table IV, and emphasizes again the difference between the time expended in treatment of the young infant and of the older children. In all the cured cases an additional 24 months of observation was required. This brings the average period of attendance at the clinic for the tertiary cases to almost five years—a truly appalling slice from a child's life. The question may well be asked, "Is it necessary or is it worth while?" If we are to accept the Wassermann reaction or the Kahn test (and the two are practically parallel) as the criterion of cure, then I believe it is worth while. There are 35 children in this series who have received continuous treatment for more than five years. Twelve of these eventually were cured, one of them requiring six and a half years' treatment and an additional two years' observation. The other 23 cases have received treatment for from five to nine years without a cure having been effected. I do not know how long one is justified in continuing.

TABLE V

AVERAGE NO. DOSES SALVARSAN GIVEN

	Cured	*Improved*	*Unimproved*
Early	24 (18.5)*	29	55
Latent	47	75	50
Late	57	73	64

* Represents average after excluding the three Wassermann-fast cases.

Table V shows the average number of doses of salvarsan given in the three stages. The greatest number of injections given to one child was 186. This patient has been under treatment for nine years, still is receiving treatment, and his Wassermann test taken last week was strongly positive.

Only three cases of arsenical poisoning have been encountered in eleven years and all three recovered. Hardening of the veins as the result of long continued treatment is extremely rare.

TABLE VI

WASSERMANN-FAST CASES

	No. Cases	*No. Wass.-Fast*	*Percentage*
Early	75	6	8
Latent	33	5	15
Late	162	56	34.5

In the above table is shown the percentage of Wassermann-fast cases encountered in the various stages. The increased number of such in the latent and late stages constitutes the real reason why the disease is so much more difficult to eradicate in the older children. For the purpose of this paper a Wassermann-fast case is defined as one who has been under constant treatment for more than two years without any significant change in the blood reaction. Such children, highly resistant to treatment, are in a large measure responsible for the discouragements and failures experienced.

Intensive courses of salvarsan, massive doses of iodides and mercury administered intramuscularly, have all proved unsuccessful in these cases. I recently selected eleven such patients to whom I hopefully administered bismuth hydrate intramuscularly, twice a week, for eighteen doses. The reason the experi-

ment was restricted to eleven children is apparent after a perusal of Table VII.

TABLE VII

WASSERMANN AND KAHN TESTS

Case	*Before Bismuth*		*Immediately after Bismuth*		*1 to 4 Weeks after Bismuth*	
JB	444	IV	444	IV	444	IV
DN	444	IV	321	I	444	III
CT	444	IV	310	II	444	IV
HH	440	IV	433	III	444	IV
WN	444	IV	444	IV	444	IV
FC	444	IV	444	IV	210	III
JC	444	IV	444	IV	443	II
MH	432	III	444	III	444	III
BK	430	I	100	II	310	I
FP	444	IV	320	II	320	II
WS	443	IV	444	IV	433	IV

There is one other factor in the treatment of the resistant child which I feel has not received the attention it deserves. When after long and painstaking treatment a negative Wassermann test has been obtained we have attributed this gratifying result to our own efforts and to the drug used, and have neglected altogether the element of time. I have seen on more than one occasion an incident such as the following: A child after receiving a few months' treatment has disappeared and has been discharged against advice as unimproved. After a lapse of three or four years during which time no treatment was given, she has again come under observation but her blood Wassermann has become negative. For the past month I have been endeavouring to trace some of my old patients who were discharged from the clinic several years ago. I have been able to find, up to the present, only thirteen of these. Most of them are now young adults earning their own living, and all are mentally normal. Twelve had been discharged cured. None of these have had any return of symptoms and in every instance the Wassermann tests have remained negative. One had been discharged eight years ago, two seven years ago, and the others at periods varying from one to six years. The other child was discharged two years ago unimproved. She had received unremitting treatment for eight years without any apparent effect on her blood Wasserman test. I was surprised to find that during her two years absence her Wassermann reaction had changed from a 443 reaction to a 110.

I feel then, that some of these cases if untreated, will eventually become Wassermann-negative. Whether this constitutes a natural cure is uncertain, since it brings up the question again as to whether or not the negative Wassermann test is a true criterion of cure, and I know of no one who is sufficiently informed at the present time to answer this question authoritatively.

CONCLUSIONS

1. One's ability to secure a permanently negative Wassermann test in congenital syphilis depends primarily on the stage of the disease in which treatment is commenced. In the early stage 80 per cent can be cured; in the latent stage 64 per cent; and in the late stage 49 per cent, provided that the treatment can be administered for a reasonable period of time.

2. From the foregoing study a reasonable period would appear to be eleven months for the early stage and twenty-eight months for the latent and late stages.

3. The comparative ease with which infants respond to treatment is due largely to the fact that Wassermann-fast cases, or cases highly resistant to treatment, are encountered in the early stage in only 8 per cent of the cases, whereas in the latent stage they form 15 per cent and in the late stage 34.5 per cent.

4. There is some evidence to show that the time element alone is an important factor in the production of a negative Wassermann test.

PITUITARY THERAPY IN HERPES ZOSTER.—D. M. Sidlick, from observations in 54 cases, advocates the use of pituitary extract in herpes zoster, particularly for the relief of pain. Intramuscular injections of the ordinary preparation used for obstetrical cases were given in from 0.5 to 1 c.cm. doses, and repeated according to the intensity of the pain. In most instances complete relief followed two injections given a day apart, and mild cases only required one treatment; some, however, needed three doses, and one patient received six. The effectiveness of this remedy as regards the lesions was only secondary to that noted in respect of the pain, the eruption eventually disappearing entirely. Pregnancy is said to be the only contraindication, and the sole untoward effect was a momentary sensation of faintness occasionally observed; the method was found to be safe in the presence of hypertension or advanced age. The author considers that the treatment has many advantages over other accepted methods, especially in the control of pain.—*Arch. Derm. & Syph.* 91, July 1930.

AFTER-DINNER COMPLAINTS*

BY GEO. C. HALE, M.D.,

London, Ont.

ANY interested observer reviewing a group of case histories chosen at random will be impressed with the frequency of the occurrence of some complaint of distress after eating, especially distress after the main meal of the day. This complaint may be anything from a sense of oppression or discomfort to an actual pain. Its appearance may be immediately or some hours after a meal; it may or may not be relieved by the ingestion of soda or eructation of gas; and it is usually localized by the patient as being in the chest or upper abdomen. This distress is often referred to as "dyspepsia" by the patient. In following the course of a patient with this symptom, as recorded in his case card, it will be found that a small percentage only, in the last analysis, were proved to be suffering from organic disease of the stomach. One therefore concludes that the stomach is frequently a mirror of some disturbance of health. We know how frequently anorexia is a symptom or sign of the onset of even the common cold. Vomiting in children often precedes the appearance of one of the infectious fevers, or in adults may be the chief complaint in tabes dorsalis, hyperthyroidism, brain tumour, and so on. Gastric symptoms may be the only signs in chronic disease of the gall bladder or appendix.

The acute problems should cause us no worry, as the underlying disease will shortly show itself; also, the majority of the systemic diseases with gastric symptoms such as those I have suggested above—tabes, hyperthyroidism, etc.—will be associated with other outstanding signs which a careful examination is sure to unearth. There still remain, however, a majority of the cases which for convenience we may divide into three groups: (1) those with no organic disease; (2) those with organic intra-abdominal disease, excluding the stomach and duodenum; (3) those with organic disease of the stomach or duodenum.

The first group is a large and very real one. It includes those patients whose symptoms may be alleviated by correction of diet or habits of eating, removal of causes of worry, or regulation of hours of work and rest. In these patients the symptoms are not merely imaginary but may be due to disturbance of the normal reflexes which are concerned in digestion. A good example of this is the discomfort which may be produced when the normal reflex of deglutition is disturbed. Experimentally, this may be imitated by swallowing a quantity of dry bread. This, from lack of lubrication, passes down the œsophagus so slowly that by the time it reaches the lower end the cardiac sphincter has closed again and the effort of the œsophagus to drive the bolus into the stomach may cause severe pain. Rapidly repeated acts of swallowing will upset the normal movement of the œsophagus, as will cocainization of the nose or pharynx. Other examples might include the abnormal gastric performances demonstrated by Todd in students awaiting their final oral examination in a major subject.

In considering the second group of those with organic intra-abdominal disease, excluding the stomach and duodenum, we must remember that occasionally such conditions as chronic gall bladder disease, chronic appendicitis, and chronic colitis will produce the so-called "duodenal syndrome". That is, they give rise to symptoms which closely resemble those of duodenal ulcer, and without laboratory assistance we would be at a loss to distinguish them from the cases of group three, which include the true organic disease of the stomach. It is not my intention to attempt to set down a rule for differential diagnosis at this point.

With regard to the third group let us consider first what are the chronic organic diseases of the stomach or duodenum. The term chronic gastritis, as found in many of our text-books, is somewhat unreal. Such a condition resulting from chronic alcoholism or improper food is a

* Read at the annual meeting of the Ontario Medical Association, Toronto, May, 1930.

possibility, but the term when applied to the gastric disturbances of cirrhosis of the liver or a decompensated heart, when congestion is the main pathological change, is a misnomer. Granted that chronic disease were present, in the vast majority of cases it would turn out to be peptic ulcer or cancer.

Now to decide whether an individual is suffering from an organic or functional type of gastric disease is one of the most difficult problems with which we are confronted. There is no other condition, with perhaps the exception of angina pectoris, where we are so much at the mercy of the patient's history and description of symptoms. We will find that in many cases of dyspepsia the question to be decided will be "has the patient an ulcer, a cancer, or merely a functional derangement of the stomach?" By functional we mean anything other than true organic disease of that organ or of the duodenum.

After the first description of gastric ulcer in 1830 there was a natural tendency to make a diagnosis of ulcer in nearly all individuals with a certain symptomatology. The dictum of one of the older clinicians that "every man who carried a soda biscuit in his pocket suffered from ulcer" was considered reasonable. Then the pendulum swung in the other direction, only to swing back when abdominal surgery became such an everyday occurrence, with the frequent discovery of a gastric or duodenal ulcer where none was suspected.

To-day the x-ray is a great help is solving our problem, but in those cases which show no deformity, and where there is no evidence of hæmorrhage, the question of whether or not ulcer is present will cause as much controversy as its sister question, whether or not a patient with ulcer should be subjected to early surgical intervention.

By the term "dyspepsia" the average patient means that he has several or all of the following symptoms: pain in the region of the stomach; tenderness in the region of the stomach; nausea or vomiting; disturbance of appetite; flatulence; heartburn.

Pain, by which may be meant anything from a feeling of discomfort to quite severe pain, is common in functional dyspepsia, peptic ulcer, and cancer. In functional dyspepsia and peptic ulcer the pain has a relationship to meals, tends to be relieved by administration of alkalies, and may disappear after the ingestion of food. The cause of these phenomena arouses considerable controversy, but it may be safe to say at least that both these conditions are associated with hyperchlorhydria. In cancer, if pain is present it tends to be of a continual gnawing character, unrelated to food unless aggravated by it.

Tenderness.—If one can be sure that there is one definitely tender spot, functional dyspepsia may be excluded as a probability. It frequently requires several examinations, with distraction of the patient's attention, to be sure that one is dealing with a persistently tender point. One must bear in mind that there is no relationship between the area of cancer or ulcer and the position of the tender point; the latter usually being in or near the midline above the umbilicus.

Nausea or vomiting is not part of the picture of typical ulcer cases, although it may be present in gastric ulcer. It is common in dyspepsia of functional type and in gastric cancer.

Disturbance of appetite.—A history of loss of appetite suggests either functional dyspepsia or cancer. As a rule people suffering from gastric or duodenal ulcer have good appetites and only refuse food or certain kinds of food because experience has taught them that they will suffer later for their indiscretion.

Flatulence is a very common symptom in both functional and organic gastric disease, although patients with a neurosis are usually the greater complainers. One is at a loss to understand the origin of all the gas which we hear the patient bringing up. It certainly does not arise from food fermentation. Much of it is undoubtedly swallowed either in the same manner as in the case of the cribbing horse; or it is due to the fact that people with heartburn swallow saliva very frequently and as a result ingest much air at the same time.

It is evident, then, that similar symptoms of so-called dyspepsia may be present in patients who have or have not ulcer. The probable signs of peptic ulcer, however, are chronicity, periodicity, relationship to meals, and food ease. The more definite signs are an x-ray picture of ulcer deformity, and evidence of hæmorrhage. Many conditions resemble gastric ulcer, but gastric ulcer resembles nothing else.

It will be noted that gastric and duodenal ulcer have been bracketed together in this

discussion. They are not readily differentiated. As Hugh MacLean states, "It is somewhat artificial to describe ulcers under two headings 'gastric' and 'duodenal', for the truth is that ulcers in the duodenal region, whether actually in the anatomical duodenum or in the pyloric area of the stomach, show practically identical manifestations." Ulcers nearer the cardiac region are characterized by somewhat different signs, but they constitute a very small percentage of peptic ulcers. Moreover, as ulceration occurs only in those regions where hydrochloric acid is found, no peptic ulcer has been described beyond the first portion of the duodenum.

Again, as we have mentioned peptic ulcer and gastric cancer as the common forms of organic gastric disease, a few words regarding the differential diagnosis would not be amiss. The first difficulty encountered is the difference of opinion as to whether cancer is frequently engrafted on a pre-existing ulcer. For example, MacLean states that duodenal ulcers have no tendency whatever to become malignant, and that malignant growth of the duodenum is practically unknown. Ewing cites ten cases of duodenal cancer engrafted on ulcer, and the Mayo Clinic publishes a report of fifteen cases of cancer of the duodenum. Of course a mere twenty-five cases compared to the thousands of cases reported of gastric cancer may almost justify MacLean's statement. Gastric ulcer and gastric cancer are both very common diseases. For many years text-books have been emphasizing the frequency with which gastric ulcer becomes malignant, and have described the change in the symptom-complex as the malignant degeneration occurs. In the light of our experience elsewhere regarding the occurrence of malignancy at a site of chronic irritation, it would not be surprising if gastric ulcer were no exception to the rule. Nevertheless in analyzing those cases where microscopic examination of an ulcer has shown an area of malignancy we must remember that although ulcers may become cancerous, cancers also ulcerate.

The common text-book description of cancer of the stomach is liable to be misleading and cause us to forget that it is so frequently a silent disease. The patient may have lost some weight, may be somewhat anæmic, yet give a history of being able to eat anything without discomfort. Then one day he may, as in one known case, eat more liver for breakfast than was his custom, or, as in another instance, he may get a dose of furnace gas, and suddenly develop gastric symptoms with pain and vomiting. On being carefully examined and x-rayed he is found to have advanced inoperable carcinoma. Early gastric symptoms in cancer of the stomach probably depend on whether there is obstruction to the pylorus or invasion of neighbouring organs. Cancer is of course a wasting disease and the picture of cachexia will give a clue to the diagnosis in the later stages. Vomiting occurs usually sooner or later and the vomitus contains the so-called "coffee grounds" material. The stools may contain occult blood, which, unlike the case of ulcer, persists in spite of treatment. There is often a distaste for food. The test meal provides valuable evidence. Absence of hydrochloric acid and presence of lactic acid is the rule in cancer of the stomach. Recently there has been a tendency to neglect the test for lactic acid on the ground that it merely indicates stagnation, and may be present in any obstructive condition. It is true that lactic acid may occur in cases of gastric obstruction and also that the rare individual produces lactic acid normally, nevertheless, the presence of this organic acid in a stomach which shows no stasis or which may empty abnormally quickly, shows that its presence is due to other factors. In a series of about 200 consecutive cases of cancer of the stomach in St. Thomas' Hospital, London, roughly 90 per cent showed absence of hydrochloric acid, and 90 per cent presence of lactic acid. The patient's age, the presence of a tumour, or signs suggesting metastases are naturally helpful in the diagnosis, but one must remember that the tumour is frequently not palpable, and that a tumour is not uncommon in chronic perforating ulcer.

TREATMENT

It would be impossible in this short paper to attempt even to touch upon the treatment of the various organic diseases to which the gastro-intestinal tract is heir. A word, however, with regard to the neuroses may not be amiss. These conditions are associated with a switchback type of digestive tract. The food does not pass with smoothness of rhythm as in the normal individual, but encounters adventures at every

step of its progress. It is hurried here, delayed there, held up by bowel spasm, and thrown back by reverse peristalsis. This situation is magnified if the patient happens to be constipated and has been placed on the diet popular for this condition including bran, fresh vegetables, and other roughage. Theoretically, the most useful drug for smoothing out the course would be belladonna, but unfortunately if given in doses large enough to be effectual the discomforts from its use are too great to be borne. Strychnine, the favoured stomachic of many physicians, is only mentioned to be condemned in the treatment of the neuroses. Sedatives, especially those of the barbital group, are more useful. One of the chief points of importance in dealing with these cases is the establishing of a sympathetic and understanding contact with the patient. Frequently the underlying cause of the neurosis is some personal or family matter of which the patient is too sensitive or proud to speak except to a sympathetic physician. Many of these causes are such that they cannot well be removed, but the mental purgation has a beneficial effect on the sufferer. Again, much can be gained in these instances, if the patient can be taught the law of submission; to stop searching for cures, and be content to get along as best he can with his handicap; he may cease kicking against the pricks and even view, if not with humour, at least with philosophical acquiescence, his after-dinner complaints.

ON THE ADMINISTRATION OF BITTERS

By V. E. Henderson,

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In spite of the conflict in the pharmacological literature as to whether the administration of bitter substances leads to a secretion of gastric juice or not there seems to be a widespread agreement that bitter mixtures are good appetizers. This may be due to their usually containing a certain amount of alcohol, which undoubtedly leads to a production of gastric juice. The reflex stimulation of salivary secretion is also not to be forgotten. Every physician recognizes the value of a bitter tonic at times, but should it contain merely bitters, or bitters and alcohol, or, as in so many of the older mixtures, alkalies as well, here are questions which cannot be decided in an arm chair. The patient, and the tastes of the patient, must be taken into consideration.

Of the pharmacopœial bitters, strychnine or nux vomica are the pure bitters most agreeable to most persons. Quassia may perhaps be ranked next, and calumba third in agreeableness. Gentian has a concomitant nastiness due to its containing tannic acid, but persons will be found who prefer it, in the form of the compound tincture of gentian, to quassia and calumba. Quinine itself and the tincture of cinchona are undoubtedly nasty persistent bitters. Some patients, of course, regard nastiness in a medicament as an indication of potency.

Strychnine has pharmacological actions which none of the other bitters possess. It tends to make reflexes more brisk and improve muscular tone. These actions lead frequently to a sense of well-being. If this effect is desired, strychnine is to be recommended.

Bitters are given usually before meals, when the beneficial effect of increased salivary and gastric secretion are most indicated, and the patient should be recommended as a rule to sip them diluted rather than to swallow them.

A very happy combination appears to be:—

℞	Tincturæ Nucis Vomicæ	mm. v
	Spiritus Chloroformi	mm. xv
	Elixir Aromatici ad	ʒ ii

This will contain 1½ drs. rectified spirit per dose.

The following is also a pleasant bitter:—

℞	Tincturæ Quassiæ	mm. v
	Spiritus Chloroformi	mm. xv
	Elixir Aromatici ad	ʒ ii

This will have the same alcohol content. Both should be diluted four times.

If the compound tincture of gentian be substituted for the tincture of quassia the mixture is not so palatable for most people, but is not unpleasant.

A favourite type of formula is one where the bitter is combined with an alkali. Of the two following, the first is most pleasant, but the second not at all unpleasant:—

℞	Sodii Bicarbonatis		gr. v
	Tr. Nucis Vomicæ		mm. vi
	Syrupi		ʒ ss
	Aq. Menthæ Piperitæ	ad	ʒ ii

℞	Sodii Bicarbonatis		gr. v
	Tr. Gentian Co.		mm. x
	Spiritus Chloroformi		mm. v
	Syrupi		ʒ ss
	Aquæ	ad	ʒ ii

Very pleasant bitter mixtures, with a lower alcohol content, not more than 40 min. of rectified spirit per dose, can be constructed after the following pattern:—

℞	Tincturæ Quassiæ		mm. x
	Vini Xerici		
	Syrupi	aa	ʒ i
	Aquæ	ad	ʒ ss

Case Reports

A CASE OF DIABETES INSIPIDUS

By L. M. Lindsay, M.D.,

Montreal

The generally accepted idea that so-called "idiopathic" diabetes insipidus pursues a course with little or no tendency to improvement is illustrated by the case of a child I have had under observation for the past three years.

This patient was a girl, 3 years of age when she was admitted to the Children's Memorial Hospital, Montreal, in September, 1927. Her complaints were: excessive thirst and the voiding of very large quantities of urine. These symptoms were first noticed the previous June, when, the mother states, the child had to urinate every hour or two, day and night and at the same time drank copiously of any fluid she could get. The warm weather was at first thought to be the reason for this unusual habit, but when it persisted medical aid was sought and the diagnosis of diabetes insipidus was made.

Personal history.—Her previous history seems to have no bearing on the present illness. She was apparently a normal healthy baby and had developed in a natural manner. She had never suffered from convulsions or any injury to the head. Chicken-pox was the only infectious disease she had had.

Physical examination.—Examination on admission revealed a fairly well nourished and developed child. Her height was 32 inches; her weight 25½ pounds, and her temperature, 98°. She was somewhat pale and her skin was dry. (There was no dehydration or œdema). She had no general glandular enlargement. In short one might say that the general physical examination was negative, and even the urine, except for the large amount voided and its low specific gravity (1002 to 1006), showed nothing abnormal on examination. At this time she was drinking from 3,000 to 5,000 c.c. of fluid *per diem* and excreting somewhat more. This paradox has been noted in other cases and explained in various ways, *e.g.*, by the absence of perspiration usually noted in these cases.

Examination of the blood showed values well within the normal range.—Blood sugar, 0.09 per cent; serum albumin, 4.6; serum globulin, 1.8; non-protein N., 25 mg.; plasma chlorides, 5.9 grm. per litre.

No evidence of intracranial tumour was found. The contour of the sella turcica appeared normal in the skiagram. The fundi oculorum were also normal. The tuberculin and Wassermann tests were both negative. So one came to the conclusion that the disorder was primary or idiopathic.

A few general observations made at the time of admission are interesting. For instance, it was noticed that the child was very irritable and peevish. Her appetite was poor and her bowels were constipated. No visible perspiration was noticed even on a warm day. She awoke about every two hours during the night to void and drink, and she had a certain amount of incontinence.

Hypodermic injections of pituitary extract (posterior lobe) were then instituted and gave

the patient immediate relief. The daily excretion of urine fell below 3000 c.c. and her thirst diminished *pari passu*. The incontinence ceased and she became happier and had a better appetite. Various preparations of pituitary extract were tried, and in various amounts. If given hypodermically all were successful, though some required larger doses than others. There seemed to be a cumulative action in the effect of this agent, for at first a daily dose of 1 c.c. was required to hold the excretion of urine at a certain level, and after a short time an injection every second day, and, later, every third day, produced the same result. In time, however, the amount of urine would increase and a daily dose was again required to reduce the amount excreted. We did not find other methods of giving pituitary extract either satisfactory or reliable, such as by the nasal spray or pledgets of cotton inserted into the nose. Nor were specially coated tablets given by the mouth of much value.

Now after three years we find the child excretes from 3500 c.c. to 5000 c.c. of urine daily, unless controlled by hypodermics of pituitary extract. Moreover, the dose of the remedy required is apparently somewhat larger than before, though it is difficult to evaluate the potency of the various products tried. Of late we have been using the vasopressor fraction of the pituitary gland, as prepared by Parke Davis & Co. Seven and a half c.c. of this every day or two maintained her in comfort with the excretion of 2000 c.c. daily.

The patient's general condition is now good. She is six years old, weighs 39 pounds and is 44 inches tall. While receiving treatment and not excreting more than 2500 c.c. daily she is contented and happy. But she soon becomes irritable when the treatment is stopped for a few days. The capacity of her bladder is enormous. She not infrequently voids as much as 1000 c.c. at a time.

While under observation she was given the ordinary hospital diet and no attempt to restrict her intake of fluids was made. For a short period she was given a diet low in salt. This apparently had no effect on the amount of urine excreted or her desire to drink.

Finally, one wonders what is to become of this child. The difficulty and inconvenience of a daily hypodermic injection are real and cannot be ignored. Without such treatment her life is miserable, and yet after three years she shows no signs of improvement. It has been suggested that an attempt should be made to transplant a pituitary gland into her body with the hope that it may supplement the defective function of her own gland, and I think it is likely that we shall recommend this procedure before long.

DISSEMINATED SCLEROSIS CAUSING SEVERE CONVULSIONS

BY CHARLES B. RICH, L.R.C.P., M.R.C.S.,

Kitscoty, Alta.

Mrs. P. D., aged 26.

Family history.—The patient was the youngest of a large family, who were healthy but all highly strung and neurotic. One brother, however, is in the last stages of disseminated sclerosis.

Past history.—The patient was treated five years ago in England for Bell's paralysis, which rapidly cleared. Two years ago, just before leaving that country, she showed signs of weakness and dizziness and was taken to a specialist who could find no definite signs of disseminated sclerosis. In Canada, on two or three occasions, she had been treated for temporary incontinence of urine and weakness of one eye.

Her husband reported that for a time she slept with one eye open and that she did not seem so bright mentally. She complained of tiring easily. She seemed absent-minded and would break off in the middle of a sentence to talk of something else. The right leg was weak and dragged as she walked. Her periods had always been somewhat irregular.

Present illness.—On answering an urgent call from her husband, I found the patient in convulsions and quite conconscious. Her husband reported having left his wife in her usual state of health to go to town, and having returned two hours later to find her lying on the bed unconscious and "shivering". The house was very untidy and dirty, an evidence of the patient's mental condition.

Observation showed the patient to be very pale and foaming at the mouth, the limbs, face and eyelids contracting spasmodically, the

spasms being more marked on the left side. Examination showed absent corneal reflexes; a pulse of 80; temperature, 102° F.; blood pressure (systolic) 130. The convulsions were with difficulty controlled by the continuous administration of chloroform and the injection of gr. 1/6 morphine. They finally ceased, after a duration of probably three hours, leaving the patient deeply comatose, with very slow shallow respirations.

The next few days the patient was irrational and had no control of urine or fæces. A week later she had regained control, was able to speak rationally, and showed the following positive signs; scanning speech, nystagmus, intention-tremor, absence of left biceps jerk, loss of abdominal reflexes, indefinite plantar response; definite muscular weakness in the right leg. The woman was unable to stand unsupported.

The laboratory findings were as follows. The blood Wassermann test on two separate occasions was negative; spinal fluid, Wassermann negative; colloidal gold test, 4555541000; globulin (Pandy) positive +++; cell count, no increase.

Six weeks later all the reflexes had returned. The nystagmus and intention-tremor were hardly noticeable, and she could walk unsupported, but with a decided limp.

COMMENTS

Convulsions, which in this case primarily overshadowed all other symptoms, are so rare in disseminated sclerosis, and are not mentioned in the ordinary text-books, so that I found some difficulty at first in recognizing the nature of this case. However, Grainger Stewart mentions that fits, either general or Jacksonian, do occur but are very unusual.

The very rapid recovery from this prolonged and severe convulsive attack is also interesting.

The occurrence of this disease in another member of the family is of interest, in the light of a probable discovery of an organism, *Spherula insularis* by Miss Chevassut, favouring as it does a possible transmission by direct or indirect infection.

An explanation such as the following might also fit the facts. The soil of a "highly strung and nervous temperament" seems to have been present in both. Loss of trophic influences in any organ will cause a degenerative change, such as seems to occur in this disease. Would it not be possible that in the delicate, highly strung, and therefore probably unstable nervous system, the interaction of nerve cells was so interfered with in some section as to cause a small trophic disturbance? Once started, a vicious circle would ensue, since the part supplied by the degenerative focus would also suffer.

A MOLAR TOOTH IN THE LEFT LOWER BRONCHUS*

BY DAVID H. BALLON, B.A., M.D., F.A.C.S.,

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F. S., male, aged 28, had seven teeth extracted under general anæsthesia on September 12, 1929. On coming out of the anæsthetic he coughed spasmodically and told the dentist that he had swallowed something, because he felt a tightness in his chest. Two days after the

FIG. 1

extraction the patient became very ill and had symptoms simulating lung abscess; severe cough with very fetid expectoration; pain in the left chest on respiration; high fever,

* From the Bronchoscopic Clinic of the Royal Victoria Hospital, Montreal.

Read at the meeting of the Montreal Medico-Chirurgical Society November 15, 1929.

(temperature 104°); and marked restlessness. The characteristic loud asthmatoid wheeze described by Jackson was audible to the unaided ear. An x-ray picture of his chest taken at this time was said to have been negative.

Two weeks after the onset of symptoms, the patient feeling no better, he consulted Dr. Bertrand, of the Bruchesi Institute, who discovered by another x-ray a tooth in the left lung, and referred him to me.

The patient was then admitted to the Royal Victoria Hospital. On October 4th a direct bronchoscopic examination was carried out under gas and ether anæsthesia. A No. 12 Kahler-Leiter tube was passed into the left lower bronchus to a distance of 33 cm. from the upper teeth. The pus which was present was aspirated, and four applications of 2 per cent cocaine, with adrenalin hydrochloride (1-1,000) solution, were used to control the bleeding from the granulations. The tooth then came into view and was removed with a delicate Jackson alligator rotation forcep. It was an upper third molar. The following morning the patient was discharged from the hospital markedly improved; the cough had ceased and the wheezing disappeared.

Two weeks later Dr. Bertrand reported that the pathological changes in this patient's lung had cleared up and that he was in excellent condition.

A FISH BONE IN THE TRACHEA OF A SIXTEEN MONTHS OLD CHILD

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E.A., male, aged 16 months, was referred by Dr. J. A. Darche, of Sherbrooke, Que., August 30, 1928.

Nine days previously, on August 21, 1928, the child had put a fish bone into his mouth. The mother immediately inserted her finger in his throat, where she felt the bone and tried to remove it. As she was not successful she pushed it down with her finger, with the intention of forcing it down the œsophagus. The child choked and vomited once but no bone was found in the vomitus. Since that time the child has been wheezing.

Within two hours of the accident and again on the following morning, unsuccessful attempts to remove the bone were made under general anæsthesia. The breathing became gradually worse, especially at night and when the child was lying down. There was no difficulty in swallowing.

I first saw the patient nine days after the accident. He was a well developed child, walking about, breathing noisily, with marked inspiratory stridor, and lesser expiratory stridor present, even when in repose. There was no fever, expectoration or fetid breath.

On arriving in Montreal, Dr. Goldbloom examined the child and the chest findings were as follows: marked retraction at the border of the ribs, the xiphoid cartilage, and also somewhat at the episternal notch; the percussion note at the left apex anteriorly slightly impaired. No other changes were noticed in the lungs. The respiratory murmur was everywhere vesicular; there were no râles and no abnormally altered quality of the breath sounds; no cardiac displacement. He expressed the opinion that there was a tracheal obstruction.

X-ray examination of the upper respiratory tract and lungs was negative.

The preliminary indirect examination of the hypopharynx showed nothing abnormal. Owing to the marked restlessness of the child it was extremely difficult without an anæsthetic to carry out a satisfactory direct examination of the respiratory tract. Consequently, under light ether anæsthesia, administered by Dr. W. B. Howell, I did a direct laryngoscopy, using Jackson's infant-size laryngoscope. The interior of the larynx was markedly swollen; subglottic œdema was present, but no foreign body was visible. I then passed a No. 8½ Kahler-Leiter bronchoscopic tube into the trachea. Fixed in the trachea wall was a fish bone. With a very delicate, thin forceps, I grasped the bone and removed it. It was a fairly large vertebral segment. The dyspnœa and stridor gradually disappeared, and the child was discharged from the Royal Victoria Hospital three days later in good condition.

Clinical and Laboratory Notes

A DIAZO-METHOD FOR DETECTING BILIRUBIN IN URINE

BY GEORGE HUNTER, M.A., D.Sc.,

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Ehrlich[4] observed that when normal urine is treated with an equal volume of diazo-reagent little change in colour takes place on mixing. When bile pigments are present in marked amount, however, an intense dark colouring results. On heating, the colour may change to a red-violet, the addition of a large amount of acetic acid sometimes bringing about the same colour change. From such a test-solution, strongly acidified with hydrochloric acid, saturated with sodium chloride, and allowed to stand for a few days, a precipitate separates, which may be filtered, washed, and found to give colour changes similar to the azo-derivative from bilirubin (Ehrlich[5]). Ehrlich further showed that the test was highly specific for bilirubin. Other bile pigments, as biliverdin,* bilifuscin, biliprasin, bilihumin, and urobilin failed to react with diazobenzene-sulphonic acid.

Pröscher[9] notes that the detection of bilirubin by the diazo-reaction in icteric urine offers some difficulty. If to such urine hydrochloric acid and alcohol are added, followed by the diazo-reagent, a brownish-red colour results instead of a blue. There is no characteristic colour change on the addition of alkali. Pröscher supposes that in icteric urine another substance is present which gives the brown colour with the diazo-reagent, and he considers that this substance is not present in normal urine, as added bilirubin is detectable in the latter. He finally recommends saturation of the urine with ammonium sulphate, dissolving the filtered precipitate in acid 96 per cent alcohol, and adding the diazo-reagent. Under these conditions a blue colour, showing a characteristic behaviour with strong alkali, was obtained. The test, however, has never been adopted.

As the diazo-reagent has proved so valuable in the detection and estimation of bilirubin in other media it appeared worth while to re-examine the possibilities of obtaining a satisfactory test by this means, especially as existing clinical tests for bilirubin in urine are not very favourably regarded. I was soon able to confirm the earlier observations that in icteric urines containing large amounts of bilirubin the diazo-reagent gives rise to badly defined colours, and the addition of acids or alcohol does not appreciably improve the colours. Contrary to the finding of Pröscher, I was unable to obtain a satisfactory test with normal urine to which a suitable solution of pure bilirubin had been added, and so would not explain the failure of the test by supposing that the interfering substance, (or substances), is excreted only in jaundice. It was apparent from such considerations that some preliminary separation of the bilirubin is necessary before a satisfactory diazo-test can be carried out in urine.

It has long been known that full saturation of urine with ammonium sulphate precipitates bilirubin (Méhu[7]). The bilirubin obtained from the precipitate dissolves in slightly acid alcohol. The addition of the diazo- reagent to this alcoholic filtrate often gives a fairly satisfactory colour, although it is frequently changed or obscured by the presence of other pigments, especially urobilin; for full saturation with ammonium sulphate precipitates the greater part of the pigment in normal or pathological urines, besides a part at least of the uric acid. This method has the further disadvantage that the precipitate cannot be centrifuged out, on account of the high specific gravity of the mother-liquor. The separation of bilirubin by calcium or barium salts in alkaline solution similarly leads to very impure and bulky precipitates, and its extraction with chloroform is uncertain and unspecific.

For our present purposes the best method available for the precipitation of bilirubin from urine is that employed by Nakayama[8]. This procedure depends on the precipitation of bilirubin by the addition of a solution of barium chloride to the weakly acid urine; Cole[1] adds a small amount of magnesium sulphate to favour the precipitation. Little or

* NOTE.—It has been stated by Davies and Dodds[3] that biliverdin, perhaps the best defined of the above substances, gives an immediate colour in the presence of alcohol with the diazo-reagent, and Roberts[10] records a similar observation. Such a finding is of course contrary to a mass of previous evidence, and an examination of the above papers suggests that the biliverdin preparations there used were not free from bilirubin. Tests by the writer with biliverdin, prepared by the Eastman Kodak Company, proved to be entirely negative. Dastre and Floresco[2] state that biliprasin reacts like bilirubin, while Küster[6] notes that dehydroxybilirubin, a non-crystalline oxidation product of bilirubin, gives a colour with diazo-compounds. The possible presence of bilirubin in both products would account for the findings.

no pigment is discharged from normal slightly acid urine on the addition of barium chloride, and the centrifuged precipitate is nearly white. If a small amount of bilirubin in alkaline phosphate solution is added to such a urine followed by barium chloride, the centrifuged precipitate is perceptibly yellow in colour. If the supernatant fluid is poured cleanly off, and the precipitate stirred with a glass rod in presence of diazo-reagent and alcohol, the presence of bilirubin is indicated by the development of a pink colour.

In certain highly pigmented pathological urines which contain relatively large amounts of urobilin and unknown pigments, there is some coloration of the barium precipitate even in the absence of bilirubin. Nevertheless, under these conditions relatively little of the total urinary pigment is precipitated, and the supernatant fluid gives practically as strong a test for urobilin as the native urine. There may however be sufficient pigment present in the precipitate to vitiate to some extent the subsequent diazo-test. This difficulty, however, has been overcome in all urines so far examined by the writer by extracting the barium precipitate with a little alcohol, weakly acidified with phosphoric acid, adding about two volumes of water to the alcoholic extract, a few drops of ammonium sulphate solution, and finally reprecipitating with barium chloride. The resultant barium precipitate then gives a characteristic diazo-reaction if bilirubin is present in the original urine.

Pathological urines are so variable in composition that it is impossible to give directions covering all types for such a test as the present. Ten c.c. of urine may be regarded as a maximum amount to use when only traces of bilirubin are present, and as little as 1 c.c., diluted to 5 c.c. with water, is sufficient in many icteric urines. In most cases the test is satisfactorily performed as follows:

To 5 c.c. of urine in a 15 c.c. centrifuge-tube, 2 c.c. of 10 per cent barium chloride are added, and the contents mixed and centrifuged. The supernatant fluid is poured off, the precipitate washed with a few c.c. of water, again centrifuged, and the liquid poured off; one-half a cubic centimetre of diazo-reagent is now added and the precipitate stirred with a glass rod. Two c.c. of 96 per cent alcohol are then added and the contents mixed. As the mixture at this stage is almost free from buffering substances, coupling is accelerated by the addition of 0.3 c.c. of 6 per cent $Na_2HPO_4.12H_2O$ solution. The colour thus obtained in the presence of bilirubin is of the same hue as that obtained with the diazo-reagent from icteric serum.

Urine generally contains enough free sulphate for the precipitation of bilirubin by this method. The reaction of the urine need not be altered before the addition of the barium chloride, unless it is alkaline, in which case it should be made weakly acid with acetic acid.

In highly pigmented urines the barium precipitate is obtained as above. It is then stirred with 2 c.c. of 96 per cent alcohol to which has been added one drop of 10 per cent phosphoric acid. The contents are centrifuged and the supernatant fluid transferred to another tube along with 4 c.c. of water. Two drops of 10 per cent ammonium sulphate are added, followed by 2 c.c. of 10 per cent barium chloride, and the bilirubin thus reprecipitated. The centrifuged precipitate is then treated with diazo-reagent, alcohol, and sodium phosphate, as above. There appears to be very little loss in the process of reprecipitation.

It would appear to the writer that this test should prove useful for the detection of bilirubin in urine, especially when other tests yield inconclusive results. It is at least as sensitive as any other test devised (the Huppert-Cole test having been tried in parallel with it) and may be regarded as entirely specific for bilirubin, as indol and indoxyl are not precipitated by barium chloride in acid solution. In certain bilirubin-free urines a slight brownish colour has been obtained on treatment of the barium precipitate with the diazo-reagent. For this reason the colour obtained should be tested with strong acid and alkali towards which the brown colour is inert. If the colour is due to azobilirubin, acid changes it to a purplish-blue, and alkali to a bright green colour. By this means positive proof can be obtained of the presence or absence of bilirubin in urine.

It would appear that with little change in technique the test could readily be adapted to the quantitative estimation of bilirubin in urine.

CONCLUSION

The possibilities of detecting bilirubin in icteric urine by means of the diazo-reagent have been reinvestigated, and a satisfactory qualitative test, which might form the basis of a quantitative method, has been described.

I am indebted to Dr. F. G. Banting, Toronto, for financial assistance to pursue this work during August, 1929.

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Editorial

THE HEALTH ORGANIZATION OF THE LEAGUE OF NATIONS

WHEN the League of Nations was established the interest of the medical profession was naturally attracted to that part of the covenant which provided that steps should be taken in matters of international concern for the prevention and control of disease. It was contemplated at first to organize the health work of the League on the general plan of the League itself, with a conference (corresponding to the Assembly), an executive committee (corresponding to the Council, and elected by the Council), and a secretariat—which would form a section of the Secretariat-General. Under this plan, the conference would have been the already existing Office International d'Hygiène Publique with an enlargement of membership and an extension of powers. Objection to this plan was raised by the United States, which, although not a member of the League was a member of the Office International, and in consequence the establishment of a permanent organization was delayed until 1924. While this delay was very generally regretted, much excellent work was accomplished nevertheless by a provisional health committee.

As now constituted, the health organization of the League comprises an advisory council, a health committee and a health section. The health section is a part of the Secretariat of the League, while the Office International serves as the advisory council. The health committee is composed of sixteen members—the chairman of the Committee of the Office International, nine members chosen by that committee and six members appointed by the Council of the League. In addition the League Council may appoint four health assessors who are virtually members of the Committee. All members are appointed for a period of three years. Health experts from countries which are not members of the League have been on the Committee since its inception. This year Canada became represented on the Committee through the appointment of Prof. J. G. FitzGerald, and we have therefore additional reason for interest in the operation of the organization.

Among the notable accomplishments of the health organization may be mentioned the establishment of a clearing house for epidemiological intelligence and a central agency for the collection of information on health questions of international concern; the collection of data relative to medical statistics; and the organization of health services with the object of devising means to secure greater uniformity; arrangements for the interchange of public health personnel; and the provision of travelling fellowships in the endeavour to broaden knowledge and bring about better understanding; an arrangement for coördinating the scientific investigation of various diseases which is being carried out in several countries; and the determination of acceptable universal standards for a number of therapeutic sera, sero-reactions and biological products. By working in coöperation with national health administrations, co-ordination of effort was secured in the control of post-war epidemics. In many other ways the organization has striven to be helpful to the health authorities of all countries, but this much curtailed catalogue of its activities must suffice to indicate how essentially international and how carefully chosen its activities have been.

The annual report of the Organization for 1929 is now available to us, and from it we learn that during the year requests were made by national governments of Bolivia, China and Greece for the advice of the Organization in the reorganization of their health services. The Bulgarian government asked for coöperation in the campaign against syphilis in certain sections of Bulgaria. During the year a survey of a number of islands in the Pacific, made at the request of the International Pacific Health Conference, and with the assistance of medical officers delegated

by the Australian government and the French colonial service, was completed. Such things must be regarded as evidence of the confidence which has been established in the methods of the Organization.

A visit of a representative of the Organization to ten Latin-American countries, although primarily in the interests of the leprosy commission, led to the discussion of the means of establishing more direct relations with the health administrations of the different Republics in such matters as infant mortality, syphilis, and nutrition. And so the Organization works on towards an understanding between nations which should prove a potent factor in the maintenance of peace as well as in the furtherance of the world's health.

The diversity of problems originating in widely separated countries necessitates a careful exploration of means by which international coöperation may be secured. The solution of many of the problems brought to the Organization requires the collection and study of a vast amount of data in order that considered judgments may be formed. The Organization, of course, cannot of itself make its judgments operative, but must depend upon its ability to present recommendations which will be made effective by the health administrations of the nations concerned.

A large share of the activities of the Organization is directed to conditions, such as cholera and plague, which may be unlikely to invade our shores, but which are nevertheless of concern to us insofar as they affect our foreign trade and shipping interests. Epidemiological intelligence is broadcasted to ships' captains and ships' surgeons, which must be valuable in the interest of both health and commerce. The arrangement is reciprocal. Steamers notify the occurrence of infectious disease on shipboard, and thus the Organization is able to warn ports of call of the approach of infected ships.

A full review of the work of the Organization would require more space than is available, and would perhaps appeal to health officers rather than to the profession generally. It should be noted, however, that experts are engaged in the study of many problems in which the whole profession is interested. Thus the BCG vaccine is being investigated from many angles and in many countries. The same is to be said of infant mortality, of nutrition, of the vitamines, of cancer, of therapeutic sera, and of certain pharmaceutical preparations. The radiotherapy of cancer is being studied at several large clinics with a view of determining how radium may be most successfully employed and most economically distributed. Much study is being given to immunization against diphtheria and scarlet fever. An elaborate investigation of the results being obtained in the treatment of syphilis, which will involve the analysis of 50,000 case records from Denmark, France, Germany, Great Britain and the United States, is being carried on. From all these studies we may expect more authoritative pronouncements than have thus far been available to us.

The most recent of the series of Statistical Handbooks published by the Organization deals with the vital statistics of Canada. This is an extremely interesting review of the methods which have been in vogue in our Dominion from its very infancy. Referring to the earliest settlements at Port Royal and Quebec, we read: "From these very modest beginnings, and in spite of the vicissitudes which marked the early settlement of these vast territories, it is somewhat remarkable to note that population records relating to the French population are available with remarkable continuity from the beginning of the seventeenth century. Such a continuous history of reasonably dependable population records is almost without parallel, but yet another interesting and important fact is associated with Canadian statistical history. It is well known that the United States has long claimed to be the first country in the world to establish a system of regular census-taking, with the introduction of that principle in 1790, yet the credit, in fact, belongs to Canada, where the French authorities provided for a census of the people in 1665, and continued such enumerations at more or less regular intervals until 1754. This early introduction of a system not generally adopted by the principal European states until the nineteenth century was no doubt due to the predominant importance of French influence in this field of statistics, for such distinguished admini-

strators as the Duc de Sully (1560-1641) and Jean Baptiste Colbert (1619-1683) had long advocated such enquiries. Apart from "Statements of Population" of which numerous records are extant, the French authorities carried out fifteen censuses between 1665 and the time of the English Conquest in 1759."

We feel that this very sketchy review of the work of the Organization will impress every reader with the magnitude of the task to which the Organization has set itself, and with the importance of its activities to the whole world. So representative a body of eminent experts, selected with full consideration of their ability for the duties required of them, working together under the aegis of a League established primarily to bring about good will between nations, and unfettered by local or national restrictions, has surely a unique opportunity to solve problems which interest us all and which have quite baffled us in the past. Many of us will subscribe to the opinion which has been frequently expressed that the Health Organization alone is sufficient justification for supporting the League of Nations.

W.H.H.

SILICOSIS

THE valuable paper on "Silicosis", by Dr. T. H. Belt, of Toronto, which appears on page 802 of this issue, serves to direct attention to a disease which is likely to assume increasing importance in Canada as an industrial hazard For many years past silicosis has presented a problem of serious economic importance in connection with the mining industry in South Africa, and it has received considerable attention also in certain of the New England States where granite cutting is an important occupation. Only within the past six years, as Dr. Belt points out, has the disease received serious attention in Canada, but it is now recognized in Ontario, at least, as a compensable form of disability. So seriously, indeed, is silicosis now regarded that the International Labour Office of Geneva, which is the executive secretariat of the International Labour Office, a society comprising fifty-six States which have entered into an agreement to improve the conditions of Labour, convened a conference, which was held during the latter half of August last at Johannesburg, to study the matter. The conference was divided into three sections: one to suggest preventive measures; one to deal with the medical aspects of the disease; and the third to consider prognosis, compensation and after-care.

Silicosis may be defined as a form of chronic inflammation of the lung resulting in widespread fibrosis, due to the inhalation of silicon dioxide. The disease is found particularly pronounced in those working with hard rock, notably quartz and granite. To produce the condition the particles of silica must reach the lung in sufficient amount, over a sufficiently long period of time, estimated at from four years to twenty, or longer; they must be less than ten microns in size; and must be chemically uncombined. The disease may, on occasion, assume a relatively "acute" form, as in two fatal cases reported recently[1] by Macdonald, Piggot, and Gilder, to which further reference will be made shortly.

Pathologically speaking, silicosis may be divided into five stages. First, a bronchiolitis, due to the accumulation in the terminal bronchioles of dust-laden phagocytes; secondly, the accumulation of dust-laden phagocytes in and about the intrapulmonary lymphatics, resulting eventually in their deposit within the tracheo-bronchial lymph-nodes; thirdly, the formation of fibrous tissue within the masses of phagocytes and its agregation into hyaline fibrous nodules, at which point the affection becomes "silicosis" in the legal aspect of the term; fourthly, degeneration of the foci; and, fifthly, the coalescence of adjacent foci and the involvement of large areas of the lungs.

Clinically, three stages can be recognized. At first the symptoms are slight, or absent,

1. MACDONALD, PIGOTT AND GILDER, *Brit. M. J.* **2: 846,** 1930.

and the working capacity of the patient may be only slightly impaired. The physical signs in the lung may, however, be found to be slightly abnormal and the radiogram may show linear and nodular shadows. In the second stage the physical signs are increased, the nodular shadows are larger and more numerous, and the physical powers of the patient are definitely decreased. In the third stage all the signs and symptoms are markedly exaggerated, and the patient's disability is complete. There is, it should be noted, a special tendency for silicosis to be combined with tuberculosis. In this last connection Dr. Belt hazards the speculation as to whether silica, which is a ubiquitous substance, may not play a rôle in the etiology of tuberculosis in the ordinary walks of life.

The pathogenesis of the disease is not so simple as it looks at first sight. Silica is a relatively inert substance, soluble with great difficulty, and yet silicosis is, perhaps, the most serious of the several forms of pneumonokoniosis. To produce the typical disease the silica must reach the lung in an uncombined state, as silicon dioxide. The silicates, as found in clay, shale, slate, and limestone, are much less harmful. It is well known to chemists that silica can be dissolved by boiling the powdered substance with an alkali, as in making "water-glass".

Several theories have been advanced. The oldest is that the silica dust acts simply as a foreign body in the lung, producing a chronic pneumonitis with fibrosis. Another view is that obstruction of the lymphatics of the lung by dust-laden cells contributes to the development of the fibrosis. Cummins and Sladden[2], in a recent study of coal-miners' lung accept this mechanism in pulmonary fibrosis, and further hold that anthracosis is accompanied by silicosis which converts a relatively unimportant pneumonokoniosis into a serious affection. Still another view is that the phagocytes of the lung become laden with particles of silica which are gradually converted into water-glass and thus the cells, virtually, become petrified. The most recent idea is that the silica is gradually dissolved in the tissues, liberating a toxic substance that produces the fibrotic change. There is experimental evidence in favour of this view, and it is also supported by Dr. Belt's observation that, while in the recent areas of deposit the dust can be readily seen with the microscope, in the older fibrotic tissue the particles have disappeared. This seems to fit in, too, with the clinical observation that the progress of silicosis does not cease when the affected person is protected from further exposure. It seems reasonable, from the evidence, to suppose that the silica is very slowly soluble in the alkaline fluids of the body, so slowly, indeed, that many years are required before the disease takes its final toll. Silicosis is, therefore, essentially a chronic disease, and, possibly would not assume any special importance, were it not for the fact that it notoriously predisposes to tuberculosis.

Following up this line of reasoning, it would also seem probable that if for any reason there were an excess of alkali in the lungs the solution and absorption of the silica might be more rapid, and we might, in that case, expect to find cases which would, clinically, run a relatively rapid course and might properly be termed acute. That this can occur is shown by two remarkable cases reported recently by Macdonald, Piggot, and Gilder. These observers record two fatal cases of acute silicosis, occurring in young women who had been engaged in packing a cleaning powder containing ground silica. One had been at this occupation for two years and nine months, and the other for four years and three months. Thus, there was a relatively short period of exposure to the dust. Death ensued within a very short time from the development of the first symptoms. The powder in question contained about 75 per cent of pure silica and 25 per cent of soap powder, made up of sodium carbonate and soap. In the first case the lung was extensively fibrotic, and of a curious greenish-grey colour punctuated with small pinhead nodules of a lighter shade. The general appearance was that of a kind of marble. With this, there was acute pleurisy and acute pericarditis. In the second case the lungs were similar, but without massive fibrosis. Curiously, here, though there was no caseation and no giant-cells could be found, tubercle bacilli were found in the sections. Examination of the lungs showed the presence of crystalline

2. CUMMINS AND SLADDEN, *J. Path. & Bact.* **33**: 1095, 1930.

silica, combined silica, and free silicic acid, derived from the combined silica, together with some iron.

The authors, in connection with these thoroughly well worked out cases, set out the following theory in regard to acute silicosis.

(1) Silica dust is deposited in the lungs and converted to colloidal silica. (2) Colloidal silica reacts with sodium carbonate, also present in the dust, giving sodium silicate, and causing the excess of the colloid to assume the "gel" condition. (3) Sodium silicate reacts with calcium, iron, and other salts present in solution, giving precipitates of insoluble silicates. (4) The deposition of insoluble silicates is cumulative, and continually builds up a film or layer of increasing thickness; at the same time the "gel" colloid is more slowly absorbed than the "sol", and adds to the condition of general congestion. (5) At a certain stage the deposited layer becomes dense enough to prevent the normal function of the lung in converting silica to colloid, and from this stage onward the silica dust will accumulate in its original state. It is not proved as yet whether this acute form of silicosis is essentially different from the ordinary chronic form or whether it is merely silicosis under the most unfavourable conditions progressing at the maximum rate. It is suggested, however, that the study of these acute cases gives a clue to the mechanism at work in the commoner forms of silicosis due to pure silica dust.

A.G.N.

ADMINISTRATION OF IODIDES BY INHALATION

IODIDES have been used in the treatment of blastomycosis and sporotrichosis for a number of years. Oral administration is the common method used, with comparatively great loss of the drug. Recently, intravenous administration has been tried but has yielded only varied results. For these reasons, and also because they believe that certain mycotic infections are hæmatogenous in origin, Swartz, Blumgart and Altschule[1] determined to try the inhalation method so that the iodide might be introduced directly into the arterial blood.

Ethyl iodide was selected because it has been proved to be both volatile and non-toxic in its previous employment for measuring the minute volume output of the heart in man. Also, it has been proved easy to introduce relatively large amounts of iodine into the blood in this way. Finding that the vapour is irritating when not diluted with a large volume of air, these authors devised a simple apparatus with valves, so arranged that non-irritating concentrations could be inhaled.

Their present study is limited to a report of the treatment of certain mycotic infections of the skin (epidermophytosis, favus, blastomycosis, tinea, cryptococcosis, psoriasis, pityriasis rosea and seborrhœic eczema). The dose used to date is 2 grm. (1 c.c.) of ethyl iodide, the inhalation being spread over 20 minutes and administered daily. Children are given half the dose. The number of treatments varied from 1 or 2 to 19. The best results were obtained in the cases of epidermophytosis, especially of the groin and intergluteal fold. However, one case of blastomycosis of a year's duration is reported which improved markedly after two treatments, but more slowly after this to the sixteenth. Two cases of pityriasis rosea completely cleared, also one case of favus of the scalp, one of four cases of infection with cryptococcus epidermica, and one of five cases of psoriasis. As would be expected, the amelioration occurred in cases treated the earliest after onset.

The authors above mentioned regard their report as of a merely preliminary nature, and suggest trial of this method of treatment in other conditions where the iodides are indicated, *i.e.*, in asthma, hypertension and tertiary. syphilis. ARNOLD BRANCH

1. SWARTZ, BLUMGART AND ALTSCHULE, *Arch. Dermat. & Syph.* **21**: 182, 1930.

Editorial Comments

Hepatitis Followed by Atrophy Due to Cinchophen Derivatives

An important paper was read in Detroit at the last meeting of the American Medical Association, by Dr. Meyer A. Rabinowitz,[1] of Brooklyn, calling attention to the number of cases in which the administration of cinchophen, or one of its numerous derivatives, has within the past few years given rise to a hepatitis which may end fatally. In his paper he presents the details of 50 cases, with 25 deaths, of which 20 were followed by autopsy, revealing a condition similar to that met with in acute yellow atrophy of the liver. The more important of these preparations are atophan, novatophan, atophanyl, cinchophen, and weldona, but there are many others.

The first case reported in literature of this poisonous action of a cinchophen derivative was reported in the *British Medical Journal* in 1923.[2] Dr. Worster-Drought reported that a man aged 59 developed a severe urticaria after taking 18 grams of atophan during a period of 12 days. Other symptoms complained of were a feeling of general malaise, severe headache, and gastro-intestinal disturbance. The drug was stopped for a few weeks. On recommencing its exhibition in half-gram doses, jaundice set in, persisting for several weeks, but ending in recovery. A second case was reported by Cabot,[3] of Boston, in 1925, in which a condition revealed at autopsy resembling that of acute atrophy of the liver, followed the use of "weldona tablets", a proprietary preparation which contained cinchophen. In discussing this case before the students, Cabot stated that he had had a series of similar cases in patients who had taken this drug for rheumatic pains. In 1926, Sir Langdon Brown[4] reported two fatal cases of jaundice following the administration of atoquinol (another cinchophen derivative), and stated that he knew of other similar cases. Glover,[5] in the same year, reported a case of gastro-intestinal disturbance, with jaundice of hæmolytic origin following the administration of atophanyl. In the same year, Sir W. H. Willcox[6] reported the case of a man aged 69 years, suffering from gout, who took 5 grams of cinchophen three times a day for a week. A few days later he became jaundiced and, after 28 days, died.

Rabinowitz gives brief details of other instances of the toxic action of this drug from many sources, both German and American, and remarks that it is highly probable that these are not all, but that other cases have occurred but have not been reported. Cinchophen preparations, he states, under various names, are extensively advertised and sold over the counter to laymen for rheumatism and as safe analgæsics. The association of jaundice with other signs of a toxic hepatitis following the use of any cinchophen preparation can no longer be considered a mere coincidence.

Atophan and other cinchophen preparations have been known to the profession for more than twenty years. In a paper appearing in the *American Journal of the Medical Sciences* in 1923, Barbour, Lozinsky and Clements[7] express the opinion that cinchophen appears to be devoid of "side" actions. This opinion is apparently held by many pharmacologists. In the recent translation by Professor V. E. Henderson,[8] of the work on Experimental Pharmacology by Meyer and Gottlieb, 1926, the investigations of Nicolaier and Dohrn are quoted to the effect that quinolin carbonic acid and its derivatives greatly increase the excretion of uric acid; especially is this true of atophan and novatophan. In the next paragraph the views of Weintraub are quoted to the effect that in gouty patients very good results may be obtained if 0.5 to 1.0 grm. of cinchophen is given three or four times daily, and this treatment is long continued. Alkaline waters should be drunk freely. "The clinically favourable effect in gout and in rheumatism depends, however, not so much on the washing out of the uric acid as on the effect of the cinchophen in decreasing the inflammation, producing analgesia and lowering the temperature."

It would appear that only under certain conditions does the liver become sensitized to the toxic action of these cinchophen preparations. The amount taken before toxic symptoms developed has varied greatly. In some individuals toxic symptoms appear shortly after the ingestion of small amounts; in others no ill effects have appeared after its prolonged employment in fairly large doses. The amount of degeneration followed by compensatory regeneration of liver tissue apparently varies with each individual case, and produces different clinical features. In some cases the destructive process in the liver is extensive and does not differ in any specific way from similar conditions due to other etiological factors. Especially predisposed to

1. *J. Am. M. Ass.* 1228, Oct. 25, 1930.
2. *Brit. M. J.* 148, Jan. 27, 1923.
3. CABOT, *Boston M. & S. J.* **192:** 1124, June 4, 1925.
4. BROWN, *Brit. M. J.* **2:** 37, 1124, July 3, 1925.
5. GLOVER, *Brit. M. J.* **2:** 136, July 17, 1926.
6. WILLCOX, *Brit. M. J.* **2:** 273, Aug. 7, 1926.
7. *Am. J. M. Sc.* **165:** 708, May 1923.
8. Experimental Pharmacology, Meyer and Gottleib. Second Edit. in English. J. B. Lippincott Co., 1926, p. 454.

this toxic action appear to be patients with gall bladder disease, cirrhosis of the liver, chronic alcoholism, those who in the past have suffered from liver disease associated with jaundice, and those who show any signs of hepatic damage due to starvation, malnutrition, or continued fever, or any condition favouring decreased glycogen content of the liver cells. The intravenous use of any cinchophen derivative must be regarded as associated with danger.

In spite of all the precautions hitherto advised, cinchophen therapy has proved toxic in a small proportion of cases, estimated by Hench at a fraction of 1 per cent. Intermittent use, to avoid retention of dangerous amounts, has proved of no avail. Large amounts of readily assimilable carbohydrates given with small amounts of insulin may protect the liver by restoring its glycogen content. With the earliest appearance of any toxic phenomena the drug should be stopped and the patient hospitalized.

In the discussion which followed, Sollman, of Cleveland, admitted that at the present we are very much at sea. Hench, of Rochester, Minn., stated that several patients had been brought to the Mayo clinic with symptoms resembling those of acute yellow atrophy of the liver following the administration of cinchophen compounds. He considered that there was ample evidence of the development of numerous minor disturbances and of an occasional fatal result from the use of this drug. He wondered why the toxicity of these preparations has been so long unreported, and asked whether there had been any change in its manufacture, and whether certain batches of the drug were toxic, or whether it was only that certain patients showed an altered metabolism. Dr. Alexander Lambert, of New York, reported a case due apparently to a proprietary rheumatism cure given to the patient by a neighbour. The jaundice increased rapidly and the man died with symptoms of yellow atrophy of the liver in a few days. This remedy for rheumatism was stated by the Investigation Department of the Association to contain large amounts of cinchophen. L. G. Rowntree, of Rochester, Minn., said that he also had seen similar cases in Rochester, and that several of them died despite everything that they could do. He emphasized the necessity that this toxic action of cinchophen preparations should be promptly and thoroughly investigated. A.D.B.

Cinchophen and related substances have little in common with salicylic acid and its derivatives. Cinchophen is built upon a quinoline nucleus, while salicylic acid is a benzene derivative. Cinchophen is a comparatively old drug, its therapeutic action having been observed first in Germany in 1908. The orginal German name is "atophan". The most important chemical modification of cinchophen is neocinchophen (German name "novatophan"). There are now several brands of cinchophen and neocinchophen, as well as newer substances of similar nature; iodine derivatives, for example, are being used in roentgen-ray examinations of the gall bladder. Among the cinchophen or neocinchophen preparations with names which do not indicate their nature are tolysin (an American preparation), and quinophan, agotan and phenoquin (English preparations). There are others, and, in addition there are preparations which along with cinchophen or its derivatives contain salicylic acid. R. L. STEHLE

THE TRAFFIC IN NARCOTIC DRUGS

The clinical address on drug addiction by Prof. W. E. Dixon which appears in our present issue deals in a masterly and comprehensive way with a subject which is attracting much attention as time goes on, and will be read with great interest. It brings forward phases of it which are not always thought of. Severe measures are required to control the traffic in narcotics and, with the assistance of the League of Nations efforts are being made to have such carried out.

Mr. A. H. Sirks, Chief of the Rotterdam police, who has been appointed an assessor to the Opium Advisory Committee at Geneva, writing in the *Police Journal*, contends* that while ordinary crimes injure, either physically or materially, a single individual or a comparatively small group of persons, opium offences threaten the welfare of whole nations and cause untold injury to national health. He insists that the havoc caused by the drug curse must be laid at the door of the illicit drug traffickers, who are guilty of one of the gravest crimes against mankind. He cites the well known case of Egypt, with some half million addicts out of its population of 14 millions, and states that from Europe large illicit consignments of drugs have been traced, not only to Egypt but to Mexico, the United States, Canada, and the Far East; while from the Persian Gulf and from China there is a large contraband trade in opium to India, Indo-China and the Far East. Notwithstanding all the efforts put forth during the last ten or twenty years, the illicit trade in these dangerous drugs is almost as large as it ever was. While admitting that limitation of production might prove useful, he does not regard it as a decisive factor, as a really effective universal coöperation of all producing countries would be essential and that would be difficult to obtain. More effective would appear to be a limitation of the manufacture of these dangerous alkaloids, and

* *Brit. M. J.* **2**: 698, 1930.

this, in Mr. Sirks' opinion, demands that concerted pressure on all the nations that manufacture them should be exercised through the League of Nations.

It is with pleasure we note in the same number of the *Police Journal* an interesting article by Mr. C. H. L. Sharman, Chief of the Narcotic Division of the Public Health Department of Canada, in which he claims that since 1908 Canada has built up a system of control, the equal of any narcotic legislation extant. By a vigilant police administration 662 persons, of whom 519 were Chinese, have been deported from Canada after conviction for possessing or selling narcotics illegally. By the aid of the Mounted Police many members of a large international gang of smugglers have been caught, fined, and committed for several years to a penitentiary, while the lash has been legalized as a penalty for peddlers in narcotics. Police evidence testifies abundantly to the fact that such drugs as heroin and cocaine conduce to criminal acts, and are resorted to by criminals to nerve them to the commission of crimes of desperate violence. A.D.B.

ARCHIVES OF DISEASES IN CHILDHOOD

The October number of the *Archives of Diseases in Childhood,* issued by the British Medical Association, has been received and contains many articles of interest to pædiatricians. It opens with a paper by Dr. G. F. Still, of London, in which the amount of immunity conferred by an attack of acute poliomyelitis is discussed. Like some other of the diseases due to a specific infection, it does seem to confer immunity for a time, but for how long has not been determined. Proof exists however, that immunity is not always permanent, although in general it is. After careful investigation, Dr. Still reports finding only 8 recorded cases of second attacks in which the diagnosis was clear. He adds another case, in which a second attack undoubtedly occurred after an interval of nearly 6 years. He concludes his remarks by saying "It would seem that there are two groups of cases in which recurrence takes place, chronologically distinct; those occurring within three months after the first onset, and those after an interval of two years or more. This silent period, the interval between the two groups, suggests that either as a result of the initial infection, or of a recrudescence of the infection within the first few weeks, an immunity is established which has a minimal duration of about two years."

This paper is followed by one presenting a very full discussion of the Anæmias as met with in Infancy and Childhood and their treatment, by A. C. Hampson and E. C. Warner, of Greenwich. A short paper follows on Spontaneous Nystagmus in Congenital Syphilis, in which the conclusion is drawn from a series of cases that this affection is a not uncommon concomitant of hereditary lues in cases which have received specific treatment, although a true Hennebert's phenomenon was not demonstrated in any of the cases. Asherson asks what part the antiluetic treatment has played in preventing the production of this phenomenon. He draws the attention of pædiatrists to this phenomenon, in the hope that all cases of hereditary lues will be examined with a view to testing for its presence. A valuable paper follows on The Tonsils and Naso-Pharyngeal Epidemics in Public Schools, a paper to which was awarded the Sir Charles Hastings prize this year by the British Medical Association and to which we hope to make reference in a future number. Meningeal Hæmorrhage in the Newborn is discussed by Dr. G. B. Fleming and Dr. Ellen Morton and records the statistics of the Infants' Department of the Royal Maternity Hospital, Glasgow. The format of the number is very pleasing. A. D. B.

THE CANADIAN NATIONAL COMMITTEE FOR MENTAL HYGIENE

Dr. C. M. Hincks, founder and medical director of the Canadian National Committee for Mental Hygiene, has been appointed by the United States National Committee to succeed Dr. Frankwood E. Williams, who is retiring. Dr. Hincks will remain in Canada, and will still continue as medical director of the Canadian Committee, and will thus become general director of both the American and Canadian Committees for Mental Hygiene, which to that extent will become amalgamated. The appointment was made at the 21st annual meeting of the National Committee for Mental Hygiene, which took place in New York on the 12th and 13th inst.

About 600 people attended, among those present being the heads of three of the large foundations, Deans of Medical Faculties, Presidents of Boards of Directors of Universities and Psychiatric Institutions, and many others interested in education and in social service. Dean C. P. Emerson, University of Indiana Medical School, presided, and among the speakers were Dr. Frankwood Williams, Dr. William A. Whyte of Washington, Dr. C. F. Martin and Dr. C. M. Hincks, representing the Canadian National Committee.

Dr. Hincks, in accepting the position of Director of the combined associations, expressed his confidence in the future of this great work, and, judging from the progress that has been made in the last twenty years, he believed that in the course of the next two decades not only would the social welfare of humanity be enor-

mously benefited, but that even in matters of education there would be a great change as a result of this great movement.

Dr. Martin, as President of the Canadian National Committee, believed that this movement inaugurated one of the greatest advances of a social kind on this continent. The needs of social services were many, but the need of humanity was one. There were no international boundaries in matters of this kind, nor in the admission of such remarkable Canadians as Dr. Hincks did he observe any high tariff walls. Such intercommunication, however, between two great nations was merely an evidence of the co-operative spirit in scientific matters which existed between Canada and the United States. In surrendering a part of the valuable services of Dr. Hincks to our southern neighbours he felt that the greater continental effort was a distinct improvement, and in the not distant future the results would be an ennobling example to other countries throughout the world in organization, co-operation and in research for the conservation of Mental Hygiene in general.

Dr. Clifford Beers, the founder of the movement, closed the meeting by a summary of his own participation since the foundation of the organization in 1908, and described in some detail the enormous influence that had been created in this movement during those years and the offers of help, both intellectual and financial which had contributed so much to the success of the undertaking. A.D.B.

F. J. SHEPHERD AND J. M. ELDER

Within the past year two Canadian names have appeared in the series of "Master Surgeons of America" published in *Surgery, Gynecology and Obstetrics*. The two chosen for this mark of recognition are the late Drs. F. J. Shepherd and J. M. Elder, and the suitability of the selection will be generally acknowledged. There were striking contrasts between the two men. Dr. Shepherd possessed highly developed artistic gifts, which he used to the fullest advantage during his long career as a teacher of anatomy. He collected anatomical and surgical specimens with a zeal and persistence which emulated that of John Hunter, and led to the building up at McGill University of one of the finest medical museums in Canada. In addition to his anatomical teaching he carried on a large and exacting surgical practice, but was able at the same time to conduct one of the largest dermatological clinics of his day. Without being in a hurry he was never idle, and the writer well recalls his breaking up a knot of gossiping demonstrators in the dissecting room with the dry inquiry, "Well, gentlemen, hath no man hired you?"

Those who knew Dr. Elder will recall his keen and vigorous manner and the never failing sense of humour with which he lightened and sharpened his teaching. He excelled in emergencies. His shrewdness and rapidity of judgment were well supported by a confident self assurance as to the best way a sudden crisis should be met. He seemed, it was said, to sense a hæmorrhage beforehand, and no one followed more exactly his oft repeated precept to "get in quickly, and get out even more quickly." An athlete himself, he never lost his keen love of games, and after watching a football match would find his own muscles aching, so closely did he follow every play in unconscious tension. And there were few of his house surgeons who did not have to thank him for tickets to the games.

But if these two men differed in temperament and manner, they had in common a rare strength of character. They spoke their minds freely and held their views strongly, and it was these qualities which enabled them to take their places amongst the outstanding figures of their profession. H. E. M.

THE LATE W. M. W. HAFFKINE, C.I.E.

Professor Haffkine, formerly bacteriologist to the Indian Government, died at Lausanne on October 26th, in his seventy-first year.

Owing to the fact that he was in close retirement for the last ten years of his life his name is probably not so well known to the medical profession now as it was a generation ago. Nevertheless, the name of Haffkine is writ large in the history of immunology, if only for his work in developing prophylactic vaccination in cholera and plague.

Waldemar Mordecai Wolff Haffkine was born at Odessa in 1860, receiving his degree in the Science Faculty of the University of Odessa in 1884. For the next four years he was on the staff of the zoological museum of his native place. In 1888 he became assistant to the professor of physiology in the University of Geneva, and, one year later, was invited by Pasteur to become his assistant in Paris. He, henceforth, rapidly gained distinction, and in 1893 was invited by the Government of India to devise measures for the control of cholera. His long training and his scientific imagination rendered him particularly well fitted for his great task, and he took up his problem with great vigor at Government Research Laboratory of Bombay, now called by his name. While at the Pasteur Institute he had worked out, with Professor Roux, a scheme for preventive inoculation against cholera and before going to India explained his theory and gave demonstrations of his technique at Netley and at the laboratories of the Conjoint Board. Haffkine's zeal in this matter was shown, also,

by the fact that he went on a pilgrimage after reaching India in order to test the procedure entailed by his theories. It took some five years before sufficient evidence had accumulated to prove the value of his ideas, but by that time it was shown conclusively that his method of inoculation was efficacious in reducing both the rate of incidence and the degree of mortality in cholera.

In 1896 an extensive epidemic of plague broke out in India, and in view of his previous success with cholera, Haffkine was asked by the Indian Government to take up this problem also. In 1900 the whole question was studied by the Indian Plague Commission, which reported that the use of Haffkine's vaccine was attended by a diminution in the rate of attack and mortality, and that it established a temporary immunity. Accordingly, the Commission recommended that, under certain safeguards, and under conditions of accurate standardization, the procedure should be encouraged wherever possible. Unfortunately, a number of fatalities consequent on the inoculation led to plague vaccination falling somewhat into disrepute, and while the inoculations were proceeded with Haffkine's control of the work was suspended by the Government. It was found, on close investigation, that the fatalities in question were due, not to carelessness in the laboratory but to a gross neglect of ordinary precautions in administration. The whole question of plague and its prevention in India was fraught with special difficulties and it was some time before the light of day was seen. Eventually, Haffkine was vindicated, for the Secretary of State, through the India Office, notified him that the decision in regard to the Mulkoval disaster was favourable to him, and offered him terms of employment in India. This offer was immediately accepted, much to the satisfaction of his scientific contemporaries, who also rejoiced in his final triumph. To-day it is agreed that Haffkine's plague vaccine reduces mortality to the extent of about 85 per cent. Haffkine remained as Director-in-Chief of the Biological Laboratory at Calcutta until 1915, when he resigned and took up his residence in Paris.

Haffkine came next into some prominence in 1917 in connection with the inoculation of the British troops with T.A.B. and his quiet influence did much to smooth over certain differences of opinion as to the desirability of its employment at that particular juncture.

Haffkine was made C.I.E. in 1917, and received in 1925 another honour which must have been particularly gratifying to him, namely that in that year the Government of Bombay changed the name of the Bacteriological Laboratory at Bombay to the Haffkine Institute, and this with the approbation of all.

The closing years of Haffkine's life were spent quietly on the continent, where he wrote freely on matters of special interest to himself, relating to his life's work, but also on Jewish racial and religious questions. His fame is secure.

A. G. N.

IN MEMORIAM: HERBERT WM. CARSON, F.R.C.S.

Herbert William Carson died in London, on August 31st, at the age of sixty years.

To many members of the Canadian Medical Association this announcement will come as a sad surprise. Carson had confidently expected to come to Winnipeg as Vice-president of the Section of Surgery and had laboured in the preparation of the program for that section. But a few days before he was due to sail he wrote stating that he felt "seedy", and that his physicians advised against his undertaking the long journey. Whilst most of his friends and colleagues were under the impression that he had sailed for Canada he entered hospital for an abdominal operation. He succumbed to post-operative pneumonia.

Carson had a very friendly feeling toward the Canadian Medical Association and toward Canadians. Our first official meeting with him was at the time of the annual meeting at Regina in 1927, when he delivered addresses on carcinoma of the colon and rectum. He also participated in the sessions of Council and there announced that he was the bearer of greetings from the then President of the Royal College of Surgeons of England, Sir John Bland Sutton, who had expressed the hope that Canadian graduates in larger numbers would qualify for that Fellowship. Carson pursued that idea and it is largely due to his initiative and persistence that we now possess the privilege of having the primary examination conducted annually in Canada.

For many years Carson had perceived the shortcomings of medical post-graduate arrangements in London and had done much to quicken interest and enthusiasm in efforts for its betterment. For seven years he was a member of the Executive Committee of the Fellowship of Medicine and Post-Graduate Medical Association and for the past eighteen months its chairman. His particular enthusiasm was apparent in his efforts to provide post-graduate facilities in London for the medical youth of the Dominions and many a Canadian graduate retains a grateful appreciation of Mr. Carson's kindly and unselfish advice and guidance given to him personally.

At the time of his death he was senior surgeon to the Prince of Wales Hospital. At successive times he had been president of the Hunterian Society and of the Medical Society of London.

Above all he was a staunch, loyal, and lovable

friend, and to some of us London will not be quite the same with Carson gone. A.T.B.

DR. S. H. MCKEE'S PRESIDENCY

We have great pleasure in announcing that Dr. S. Hanford McKee, Lecturer in Ophthalmology in McGill University, has been chosen as President-elect of the American Academy of Ophthalmology and Oto-Laryngology. This Academy is composed of more than eighteen hundred members, who have all passed a special examination for admission. The Academy maintains two Research Fellows, one in Ophthalmology and one in Oto-Laryngology, and has done much to raise and maintain the standards of these specialties in recent years.

THE UNIVERSITY OF WESTERN ONTARIO MEDICAL JOURNAL

The first number of a new medical journal is before us. It is the product of the optimism and initiative of the undergraduates in Medicine of the University of Western Ontario, and in no sense the direct outcome of effort on the part of the Faculty or Alumni. We understand that some two hundred students subscribed a very substantial sum of money in order to put their faith to a decisive test. They deserve great commendation for their enterprise. Naturally, they will expect and receive the support of their elders, among whom the editors mention Drs. George MacNeill, George A. Ramsay, J. W. Crane, and H. Alan Skinner as some to whom they are under special obligation.

The aim of the new journal is threefold. It is hoped that it will forge another link in the chain of association between the graduates of the University of Western Ontario and their Alma Mater. A publication is offered which is devoted to the peculiar problems and interests of the medical profession in Western Ontario. An invaluable opportunity is presented to the medical undergraduate to acquire habits of close observation, accuracy of thought, and correctness of expression.

We would deprecate the publication, in Canada, of another medical journal, in the ordinary sense of the term. We do not need any more such. Yet we believe that journals like this latest effort, if kept within proper limits, subserve a useful purpose. All editors receive at times material for publication which, while excellent in substance, is illogical in development and confused in language. It is, on the other hand, a delight to read a paper that is simple, clear, and well expressed. Undergraduate journals, such as that considered here, are of great value, in that they afford to the neophyte in medicine a medium by which he may learn excellence of technique. Simplicity, clear thinking, and precision, if not elegance, in expression are crying needs in medical literature at the present time. Then, again, it must not be overlooked, that the writer of a scientific paper of the kind so much required gains more than do his readers. The training is helpful in more than one direction.

The new journal, therefore, has our blessing. A.G.N.

We desire to draw special attention to the accompanying notice which emanates from the Royal College of Physicians and Surgeons of Canada. It is most important that the profession should know that there are a certain number of vacancies in the Fellowship which it is competent for the College to fill and that the applications under the Act must be in hand before June 14, 1931.

ROYAL COLLEGE OF PHYSICIANS AND SURGEONS OF CANADA

The Royal College of Physicians and Surgeons of Canada desires to draw to the attention of the physicians and surgeons of Canada, Section 5 of the Act of Incorporation of the College, which Section reads as follows:—

> "The Council may, at any time within two years after the coming into force of this Act and without examination, select and admit as Fellows any duly qualified persons domiciled in Canada who have in their opinion given evidence of high ability in one or more departments of medicine." (Act assented to and in force June 14, 1929.)

Members of the profession who consider themselves as qualified for admission to Fellowship under this Section of the Act, are invited to apply for qualification forms to Dr. T. C. Routley, Registrar-Secretary of the College, 184 College Street, Toronto.

PUPILLARY REACTIONS DURING PREGNANCY.—Believing that excess of an adrenaline-like substance might circulate in the blood during pregnancy, Z. Bercovitz instilled the serum from a pregnant woman into her own conjunctival sac. He found that in about 75 per cent of cases the pupil showed a consequent variation, which consisted more usually in dilatation than in contraction, but sometimes merely in increased activity. Two only of 98 non-pregnant women showed any pupillary response to a similar procedure. About 75 per cent of pregnant persons were found to respond by some papillary change to the conjunctival application of adrenaline, which was ineffective in practically all non-pregnant women. In twelve men the pupil was not affected by instillation of their own serum or of adrenaline.—*Am. J. Obst. & Gyn.* 767, June 1930.

Special Articles

RECENT ADVANCES IN SURGERY

BY A. D. BLACKADER, M.D., LL.D.,

Montreal

In an interesting paper read at the last meeting of the American Medical Association,[1] Dr. William Mayo, of Rochester, called attention to the changes in surgical practice arising from our advancing knowledge in physiology and biology. Until late in the nineteenth century surgery consisted chiefly of operations of necessity; the surgeon was a clinician who devoted more of his time to surgery than to medicine. With advancing knowledge differing opinions developed between physicians and surgeons as regards treatment. The conservative practitioner objected to operations for many conditions, which finally were recognized as surgical. On the other hand, the surgeon frequently advanced too far and too rapidly into fields in which some, but not all, of the operations undertaken were necessary. The comparison of the results obtained, however, acted for the good of medicine. The clinician served as a brake on the surgeon, and the surgeon was obliged to limit his work more thoughtfully. To-day, the enormous advance in surgery has split the surgical profession into groups with fields often too limited, and the surgeon has in great measure lost touch with general medicine, and has become dependent on the internist as never before.

Among the more notable researches to which surgery owes much was the elucidation of the relation of iodine to disturbances of the thyroid gland. Plummer showed that, contrary to the general view at that time, the introduction of iodine removed the immediate effects of the deleterious secretions, and restored the patient to a condition in which thyroidectomy, formerly a most hazardous operation, became one of safety. Later on the discovery of insulin in the laboratories of the University of Toronto had a similar result, not only diminishing the number of amputations, often almost hopeless in character, but making other necessary surgery almost as safe for the diabetic as for the non-diabetic patient. The increased knowledge, also, of vitamins and of the baneful effects of their deficiency has been of great assistance in surgery as well as in medicine, for, next to infection the deprivation diseases could do more than almost anything else to darken surgical prognosis.

Surgery is also greatly indebted to our increase of knowledge regarding the functions of the endocrine glands. The thyroid and suprarenal glands are now known to be closely associated with the sympathetic nervous system and the vascular phenomena of disease, and our increased knowledge of the interrelation of the central nervous with the sympathetic nervous system has opened up new fields in which surgery has been able to intervene and check the progress of disease.

At the recent meeting in Winnipeg the surgery of the sympathetic system was fully discussed.[2] Dr. Mayo opened the discussion with a brief review of the advances made during the past few years in this department of surgery. Early operations were for the most part concerned with division or removal of the cervical sympathetic chain, in the hope of benefiting such diverse maladies as epilepsy, facial paralysis, exophthalmic goitre and angina pectoris. Although these procedures were popular at first the benefits derived were not very obvious. The next important attempt in the surgery of the sympathetic nervous system was the operation of ramisection, introduced by Hunter and Royle in 1923 with the hope of relieving spastic conditions in the voluntary muscular system. Undeterred by the untimely death of Hunter and by his own ill-health Dr. Royle performed the operation in many countries, but unfortunately subsequent results were not considered very successful. At the Winnipeg meeting, however, Royle reaffirmed his faith in the value of the operation and in the underlying hypothesis, and his statements were supported by both Canadian and American investigators. Two facts that developed after the operations were that limbs deprived of their sympathetic fibres became much warmer, and patients who had formerly been constipated had free and frequent action of the bowels. Acting on these observations, A. W. Adson, of Rochester, stated that he was able to improve the circulation of the lower limbs, and thus to treat successfully cases of Raynaud's disease and to obtain encouraging results in certain cases of thromboangiitis obliterans, scleroderma, and chronic arthritis in patients with cold extremities. The improvement obtained in Raynaud's disease was so marked as to make him believe that this condition was due to excessive activity of the vasoconstrictor fibres. This supposition, however, would appear to be negatived by the investigations of Sir Thomas Lewis, but it is admitted that although the operation may not remove the definite cause of Raynaud's disease, it improves greatly the circulation in the limbs affected by vascular spasm. Royle also claims that the operation has been of great value in writer's cramp, atypical neuralgia of the face, and in five cases of retinitis pigmentosa.

At the meeting a convincing report was also given by R. B. Wade on the value of the operation

1. *J. Am. M. Ass.* **95:** 644, Aug. 30, 1930.

2. *Lancet* **2:** 639, Sept. 30, 1930.

in cases of Hirschsprung's disease and in some cases of chronic constipation, and his results were confirmed by I. R. Learmonth, who has opened up a new field of sympathetic surgery by dividing the sympathetic nerve supply to the bladder in certain cases of defective micturition following myelitis and other lesions of the cord which affect the parasympathetic system. An editorial in the *Lancet*[3] admits that the operation has won an assured place in surgery.

Lord Moynihan, in closing the discussion, stated that in his opinion the surgery of the sympathetic nervous system was now entering on an era which might justly be termed an era of physiological repairs, for which we are greatly indebted to Dr. Royle.

3. *The Lancet*, **2**: 645, Sept. 30, 1930.

THE SCIENCE OF MEDICINE

(Abstract of an address, delivered at the opening of the Banting Research Institute, of the University of Toronto, by Lord Moynihan, K.C.M.G., C.B.)

Lord Moynihan at the opening of this new Institute for Medical Research, erected to commemorate one of the great discoveries in the history of medicine, began his address by recalling the fact that Medicine is, in truth, the parent of all the sciences, and that intellectual or technical assault upon every branch of human knowledge depends upon principles brought into existence and notably enlarged by those engaged in the practice and teaching of Medicine.

That the world in which we live is governed by laws, and that man has formulated these laws after close observation of phenomena, and by experiment has tested their validity, are facts, the appreciation of which we owe to Greece. The Science of the Greeks was from first to last the child of Medicine. To Hippocrates, Father of Medicine, we owe the establishment of the inductive method of logic; by the application of his mind to the study of Nature, and to Disease in its various forms, he founded the principle that from a multitude of singular facts a general truth can be evolved. To Galen we owe the deductive method, the method of trial by experiment. The method of Hippocrates, the inductive method, deals with facts and phenomena already in existence, discovering them by observation, yet creating nothing. The method of Galen, the deductive method, creates new facts by experimentation as it needs them in illimitable number and in endless variety.

The method of observation, the Hippocratic method, was the first to be evolved. It has many difficulties, which become more clearly realized as experience grows. A perception keen enough to recognize the truth, free it from error, and range it for comparison or coördination alongside other truth, is one of the rare qualities of mind. Momentary lack of attention, of concentration, and of interest; prejudices which come from alien experience, credulity or personal desire; confusion, which follows from comparisons made almost or quite unconsciously; all tend to blur the image, or derange the thought of the observer.

In making observations, therefore, to act safely, we must proceed according to method, and method implies both appraisement and selection. What shall govern selection? Observers will not agree upon the answer. When a complex problem is repeatedly examined, the observer is at first concerned with resemblances among facts. Afterwards differences, rather than resemblances, hold the attention, and are apt to receive undue prominence in continued observation. The aim should be, not so much to discover resemblances and differences as similarities under apparent discrepancies which may lead at last to fruitful classification.

The making of observations is by no means a random or simple procedure but is governed by a number of factors, some of which are an integral part of the problem itself; others are the property of the observing mind. Herein lies one of the difficulties inherent in the science of medicine. In other sciences the phenomena presented for observation are pure; in medicine they are rarely unaffected by their passage through the medium of the patient's mind. The observer is thus confronted not with phenomena as they really exist but with phenomena blurred or altered in varying degree by the mind or affected by the will of the patient. Furthermore, to an extent that varies in different individuals and in the same individual on different occasions, the observing mind may have its perceptions deflected and its judgment warped by variations in the working of its own mechanism. This is perhaps more often the case in medicine than in any other science, sociology alone excepted. We must, however, never be indifferent to the fact that the contributions of the mind of the individual whose phenomena are submitted to objective study may have an important value.

It would accordingly seem to be the clear, indeed the paramount, duty of teachers of medicine to inculcate the value, and to give instruction in the method of observation as a primary and important faculty required in students. Zadig should be accepted as their patron saint. Practice in observation confers aptitude, but an intuitive faculty is, beyond doubt, a property of many minds. Blank observation of phenomena, however, is not

enough; the mind must not merely apprehend phenomena, but must also, as it were, play with them, by analogy creating suppositions or forming notions regarding them, and making tentatively new arrangements and drawing inferences from these. Hypotheses must be freely made and tested by further controlling observations or by experiment; ideas must be encouraged to arrange themselves, and to shape themselves anew in the observer's mind; yet such new ideas must always be controlled by fresh observation and experiment.

The difficulties of the method of induction in medicine are in part due to the fact that it is inevitably imperfect. Not all cases can at all times be submitted to observation; not all cases present at any one time the same objective features. Diseases recognized by change of structure, by disturbance of function, or by symptoms of infection present a pageant in which innumerable individual phenomena take part, and the complexity inherent in all biological phenomena is seen. Events in medicine, as elsewhere, are rarely dependent upon a solitary cause, and Medicine is, perhaps, distinguished from all other sciences not only by the number and inter-action of possible causes, but also by the remoteness and apparent irrelevancy and obscurity of causes. Finally, we may say that induction is the method by which all the materials of a problem are brought to an assize in the mind, all the manifold apparatus of the mind set to work upon them, all analyses and ultimate syntheses carried out, and occasions provided for the submission of the results so obtained to the method of deduction or testing by experiment. Through observation and its auxiliary properties, clarity, order, and a singular felicitous coherence of all parts become apparent in problems at first inchoate and bewildering.

The Galenic, or experimental, method depends upon the observation of conditions after specific influences have been directly and consciously exerted upon them by the investigator. Control is the essence of the difference in method. The Hippocratic method, surveying a large field, attempts to discover similarities, uniformities or discordances, to make comparisons, and establish classifications and general laws. The Galenic method sets up its own inquiries, reducing them in each individual example to the simplest terms in order to obtain an unequivocal reply. The mental qualities required in the investigator are the same as those employed by the trained observer in the Hippocratic method, although owing to the comparative simplicity of the arranged inquiry the same strenuous demand is not made upon them after the experiment begins. While in the method of observation analysis predominates, in the method of experiment isolated truths are disclosed which lend themselves to synthesis.

Animal research by the Galenic method has high value but strict limitation. For its perfect application, the clinical or other problem which it is desired to resolve must be submitted to minute analysis. Every item so isolated may be made the subject of a specific test by experiment; the answer obtained may then contribute, in coördination with others similarly gained, to an explanation of the original complex problem. Regard, however, must always be paid to the impossibility of translating in every case, or under all conditions, experiments on animals into terms strictly applicable to man. The material of the human body is neither the same, nor is it subject to the same influences as that of animals, even those nearest to man. Similar functions are not wholly discharged by similar mechanisms; the pressure of environment is not comparable in the two cases, and, above all, the mind of man is infinitely complex in comparison with that of the most intelligent of animals. Still further, the changes produced in experiment upon normal animals are relatively gross; the changes produced by disease in man in the early stages which should arouse our chief interest are minimal and of so fine a texture that we cannot properly compare them with the coarser induced conditions in animals. Royle's discovery of certain functions of the sympathetic nervous system of the goat proved to be applicable to man, although when animals lower than goats were chosen no such agreement could be discovered. Notwithstanding its many drawbacks, animal experimentation remains of extreme importance and yields fruitful results, in value only second in accuracy and relevance to that of direct hominal research itself, with which whenever possible it should be compared. Hominal research, when possible to be conducted during surgical operations or at other times, is the one unassailably accurate method of acquiring the knowledge we need. Its gifts to medicine have been invaluable, perhaps equal in number and not inferior in importance to those made by any other method.

The question whether medicine is to be classed among the sciences has been variously answered by different writers, many of whom speak with acknowledged authority. My late revered teacher, Sir Clifford Allbutt, in whose study I worked, failed to do justice to medicine when in his essay "The New Birth of Medicine" he refers to its development "from an act of observation and empiricism to an applied science, and from a descriptive code of surface phenomena to the discovery of deeper affinities." Medicine is a science of observation, critical dis-

crimination, and of coördination and classification of facts which lead themselves to verification by experiment. It differs from other sciences only by reason of its broader base, and the extreme complexity of its numberless parts with their manifold reactions upon each other. It ranks with biology, and with it offers the admittedly greater difficulties attaching to classification of living substances as compared with non-living matter. It uses the same methods as all other sciences, methods which it invented. For its elucidation and extension medicine owes much to the method of observation, and in recent years to the method of experiment both hominal and animal. At the moment, however, the method of observation appears to be somewhat out of fashion, and the vast treasures of knowledge it has created for us are disparaged and in danger of being forgotten, while the method of experiment appears to have captured the fancy of the profession, and the precision of its facile results has created a degree of confidence which has never attached itself to clinical observation alone. In medicine both methods are applied to the problems of diagnosis and classification. The diagnostician is primarily concerned with the recognition and qualitative determination of morbid phenomena. To this determination the laboratory provides on some occasions nothing, on many occasions much, on a few occasions almost all that is necessary. The task of the clinician is to gather together and to integrate the items of knowledge culled from all sources, and in the end to pass judgment. In seeking causes and explanations of disease, in the making and selection of relevant observations, and in reaching considered judgments a scientific procedure of the most austere and arduous kind must be undertaken.

Medicine as an applied science lends itself to the method of direct experiment far less readily than perhaps any other science. Sir William Jenner regarded the administration of every dose of every drug in the nature of an experiment. That is the right view; it should also be so with every operation. The variable results obtained emphasises the need for regarding every such undertaking as an individual adventure to be closely scrutinized. Surgery should, speaking generally, be something more than mere therapeusis; it should be an instrument for research; its application requires adjustment to every individual case, and observation continued over a long period can alone determine the validity of the experiment. All this is apt to be overlooked. The complexity of the problem renders it impossible to consider it alongside the methods of the laboratory. Only a few specific features lend themselves to control; the majority are beyond our control and more or less immutable. The experiment and subsequent observations make, therefore, a more exacting and prolonged demand than do the procedures of the laboratory. Hominal research would gain inestimably if the exact methods of the physiologist in respect of records and complete analyses were strictly applied.

It is for many reasons a matter of serious concern to medicine that physiologists have to a great extent neglected hominal research. The primary explanation for this is to be found in the cleavage between descriptive anatomy and functional anatomy (physiology) made a century ago by Sharpey. A knowledge of structural anatomy is important alike to physician and surgeon, although the teaching of this subject has become too precise and detailed for the needs of ordinary medical practice. When the surgeon requires special knowledge of any particular organ, he falls back upon an advanced text-book, and when that fails him he is compelled to make his own investigations into normal or aberrant details of structure. As regards physiology its severance from anatomy was an immediate advantage. The Galenic method, with its experimental basis, proved attractive to many investigators; the charm of devising new experiments, the creation of new knowledge, and the delight of intellectual adventure proved a source of endless interest to minds seeking novelty. Unfortunately, little by little, and insidiously, investigators have wandered away from interest in man, and the science of hominal physiology has become more and more neglected. The great majority of investigators appear to have lost by degrees their contact with or direct interest in biology, and the science of physiology has become an amalgam of bio-physics and bio-chemistry. The question arises whether it is not time that physiologists re-discovered an interest in man. Man's body is accessible to their inquiries, not only in conditions of health but also in conditions of incipient deviation from health as yet unrecognizable by the cruder methods of day-to-day clinical medicine. Physiologists are justly proud of the great conquests of knowledge which lie to their credit since their science developed independent existence, and English physiologists have pride of place in many discoveries of recent years; but their aloofness from medicine has yearly become more obvious, their discoveries of less value to clinicians; their science indeed is playing truant. If, for example, a standard text-book on physiology is examined it will probably be found that one-fourth or one-fifth of it is devoted to a discussion of physiology of muscle. No text-book of medicine or surgery, however, contains more than a few pages dealing with the injuries or diseases of muscles. The work of physiologists

may doubtless have a high scientific interest, but a large part of it would appear to have little clinical importance; problems are neglected in which physicians and surgeons are eagerly seeking solution through the aid of the physiologist.

Advances in surgery during the last thirty years have been considerable. Lister placed in the surgeon's hands a potent weapon, of which use has been made to devise operations for the relief of structural disease and to study the pathology of the living. The anatomical training which all surgeons had received was of advantage in enabling them to conceive the new operations then attempted. In the direction of relieving structural defects or diseases by appropriate methods, little remains to be done. Surgery is now seeking to discover methods of dealing with disorders of function rather than to repair disorders of structure. In this advance surgery must call upon its allies for all possible help. Old knowledge is not adequate, new knowledge must be created, and new applications and new interpretations of old knowledge suggested. Investigations must in part at least be conducted upon man. Just as physicians, to use Sir William Osler's phrase, were "caught napping" by surgeons who asserted the frequency and created or amplified our knowledge of gastric and duodenal ulcer and of cholelithiasis, so physiologists have similarly had their somnolence proclaimed by the researches of Royle and Hunter, and Wade of Sydney, Robertson of Toronto, Judd, Adson, and Learmonth, of the Mayo Clinic, and others, on the sympathetic nervous system, and its influence upon maladies of men as diverse as Raynaud's disease, Hirschsprung's disease, endarteritis obliterans and retinitis pigmentosa. Learmonth's recent investigations carried the possibilities of helpful or remedial surgery still farther. Increased knowledge in reference to the ductless glands, the sympathetic nervous system, and the problems of immunity is urgently called for. It is imperatively necessary that physiologists, physicians and surgeons should coöperate in the application of laboratory knowledge to clinical problems, and that physiologists should interest themselves not only in normal functions but in those near normal which indicate the earliest movement toward disease. Surely the greatest need in medicine to-day is the power of recognizing early pathological changes and the onset of functional aberrations before grave or irremediable conditions have tardily developed. Quoting from the last report of the Medical Research Council, Lord Moynihan asked the question, "Is there a science of experimental medicine of which the actual material for study is the human patient?" Or is scientific work by the physician or surgeon limited to the application in his art of the scientific results worked out in the laboratory and delivered to him for use? The latter of these questions appears to show a measure of unfamiliarity with the position of clinical medicine and of clinical surgery to-day. In reference to both medicine and surgery the assumption inherent in the question, that ready-made weapons are fashioned in the laboratory and handed over with magisterial authority to the profession, is too amusing for serious discussion. In surgery, the most notable and revolutionary change which, thanks to Lister, has come over surgery is the creation during the last thirty or forty years of a completely new knowledge of visceral disorders. The study of visceral diseases as a part (a by-product) of the activity of surgeons has helped us to re-write the clinical symptomatology of such conditions as gastric and duodenal ulcer, cholelithiasis, diseases of the intestinal canal, of the pelvic organs of the female, and of such splenic troubles as hæmolytic jaundice and splenic anæmia. This scientific advance was dependent upon observation and experiment in which the actual material for study was the human patient. The contribution of the laboratory to the surgery of the stomach has been almost negligible, and the same may be said of our knowledge regarding cholelithiasis, and its multitudinous complications and treatment. Neither has the laboratory materially helped to supply the knowledge so urgently desired by the profession of hepatic physiology and its insidious transmutation into hepatic pathology?

Physiology in its relevance to human problems is not, as Sir Thomas Lewis suggests, outstripping medicine, but is lagging too far behind, concerned too much with laboratory and with mice, too little with hospital wards and with men. It is a matter for regret that laboratory workers do not fully realize the immense opportunities that would be afforded by combining animal with hominal research. At the present time physiological and other forms of research appear to be drifting further and further away from clinical medicine, to the very real disadvantage of both. It is nothing less than disastrous that the knowledge of the sympathetic nervous system created by Gaskell and Langley should have remained so long without full application to the practice of medicine. The work of Royle and Bennett has given a new vision to medicine, has created new knowledge, and has resulted in the very advantageous application of old knowledge to surgical problems. It is, I think no exaggeration to say that the results of their operative measures were received at first without enthusiasm, and even with a rather supercilious condemnation by workers in physiological laboratories.

Divorce of research from observation and of the research worker from the clinician appears imminent. The results will be tragic. An essential problem is to arrange the work of hospitals so that both geographically and spiritually the laboratory becomes a part of it. At present routine examinations in the laboratory occupy all the time of the staff. The physician or surgeon receives briefly written reports upon specimens submitted for examination. These are insufficient. Meetings between clinicians and laboratory workers should take place regularly. These men should be inseparable intellectual companions. Laboratory workers should more often seek their clue and find their inspirations in the suggestions of clinicians.

Lord Moynihan concluded his very interesting address with the following tribute to Professor Banting.

"The inauguration of the Banting Research Institute at the University of Toronto is for me one of the happiest duties of my whole life. This is a moment of high romance in a land of dreams come true. Professor Banting, reading for the primary examinations for the Fellowship of my College and still keeping his mind on problems of general medicine, became possessed of the idea of extracting the hidden virtues of the islands of Langerhans and of using them in the treatment of diabetes. As so often happens, the dreamer of dreams surrendered every object to his quest. He came to Toronto, where he was allowed the use of the physiological laboratories, and was helped by Professor Best, then only an assistant but whose name is now forever linked with his own.

"Banting conquered and to-day as a gift from all mankind he wears with becoming humility the crown of immortality. In his honour we raise to-day this temple of science. Memorials are of many kinds; some are graven in stone; some are cast in bronze; some are written in letters of gold upon the roll of honour which enshrines the name of the saviours of their country. There is, however, yet another memorial borne in the hearts of those from whom a heavy load of suffering and of sorrow has been lifted. In the grateful hearts of those rescued from death and of those who spend their lives in the sacred ministry of healing, the true memorial to Banting will be found. Is not his, indeed, a crown of immortality?"—Abs. by A. D. BLACKADER.

Men and Books

THE PART PLAYED BY SCOTLAND IN EARLY CANADIAN MEDICAL DEVELOPMENT*

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The story of early Canadian medicine under the French regime has been vividly told by Heagerty in the opening chapters of his "Four Centuries of Medical History in Canada." There came a period after the cession of Canada to the British Crown by the Treaty of Paris in 1763 when a much more intensive development of medicine and medical institutions took place through the English speaking inhabitants of the provinces. The object of the present paper is to give some account, however incomplete, of the developments that were due to men who had been trained in Scotland. Sometimes these were Canadians, who, after a course of study in Scotland, returned to their native country, and in a smaller number of cases they were immigrants seeking their fortune in a new land after graduation. The greater number of these men were trained at Edinburgh. In the century which followed the incorporation of Canada into the British Empire, and the American revolution, up to the period of Canadian union in 1867, Edinburgh became the great resort for Britons beyond the seas.

The first American colonial who graduated M.D. at Edinburgh University was Thomas Jarvis, from the island of Antigua, in 1744. For the next twenty years almost every session saw one American graduate, including such men as William Shippen, John Morgan and Benjamin Rush, all of Pennsylvania. After 1764 they came in greater numbers, and in the following century 650 students from the Americas graduated at Edinburgh. This does not include many who came for a year or two to take some classes, nor those who contented themselves with a licence from the Royal College of Surgeons. The total number of the Americans who studied at Edinburgh should probably be at least twice as great. Out of the 650, 180 came from those colonies which became the United States. As regards Canadians, beginning with John Macculloh, who, in 1793, thirty years after Canada had become a British possession, came to Edinburgh from Sarnia, 104 Canadian born students graduated M.D. at Edinburgh by 1867.

At the less well known University of Glasgow in the same period there graduated 85 students

* A paper embodying the remarks of Dr. Comrie in opening the Session, as President, of the Section of Medical Sociology and History of Medicine, at the combined meeting of the British and Canadian Medical Associations, Winnipeg, on August 27, 1930.

from the Americas. Of these 13 were Canadians, including such well known names as those of Le Baron Botsford from New Brunswick in 1835, and William Johnston Almon from Nova Scotia in 1838.

Just before the American revolution, a youth of some thirty years, James McGill, emigrated from Glasgow and settled in Montreal when it was a little town of 9,000 inhabitants. He had studied for one year at the University of Glasgow, and being impressed by the necessity for the advancement of learning in Canada, he left a share of the fortune he had made when he died in 1813 to found a university to be named the McGill College.

Up to this time numerous Canadians had studied medicine, chiefly at Harvard, but quacks abounded everywhere and the need for medical training was admittedly acute. In October, 1822, Dr. A. F. Holmes, who had graduated at Edinburgh in 1819, and Dr. John Stephenson, a native of Montreal, who had graduated at Edinburgh in 1820, were appointed by the medical officers of the Montreal General Hospital to draw up a statement setting forth the difficulties of the students of Canada, and the "imperious necessity of establishing, after a permanent manner, a seminary of medical learning, together with an outline of the proposed medical institution and the suggestion that this be established and duly incorporated." The result was that a scheme for a school of medicine centred on the Montreal General Hospital was drawn up, which was avowedly based upon the plan of the medical school at Edinburgh. This school received the approbation of Lord Dalhousie, and, under the name of the Montreal Medical Institution, was opened on November 10th, 1824, with 25 students. Dr. Stephenson was to teach anatomy, physiology and surgery; Dr. Holmes was assigned chemistry, pharmacy and botany; Dr. William Robertson, another Edinburgh graduate, who had been born in Scotland, and had served as a military surgeon and emigrated to Canada, was to teach midwifery and diseases of women; Dr. William Caldwell, who had been born in Ayrshire, Scotland, and had studied at Edinburgh and been a military surgeon, was to profess the practice of physic.

The officers of this Montreal Medical Institution were afterwards constituted the Medical Faculty of McGill, and in the year 1832 obtained a royal charter. The professor of medicine, elected in this year, was Thomas Fargues, an Edinburgh graduate. From this small beginning the University of McGill College rapidly increased, so that it numbered 108 medical students in the year 1860, and ultimately became one of the most famous schools of the western hemisphere.

L'Université de Montréal, which was incorporated in 1920, was the product of the union of L'Ecole de Médecine et Chirurgie de Montréal, which was the first French medical school to be established in Montreal, and of L'Université de Laval de Montréal, which was originally a branch of L'Université de Laval de Québec. L'Ecole de Médecine et de Chirurgie had been founded in 1843 by a group of medical practitioners, Drs. Arnoldi, Francis Badgley, Munro, Sutherland and McNider. Dr. Francis C. T. Arnoldi, the first president of the school, had graduated M.D. at Edinburgh in 1827. Dr. Francis Badgley had graduated M.D. at Edinburgh in 1829. Dr. Pierre Munro was of Scottish descent, from the family of Munro of Foulis, and his ancestors had been in Canada since the conquest. Dr. William McNider had graduated M.D. at Edinburgh in 1836, and in addition to lecturing on obstetrics in L'Ecole de Médecine, was one of the founders of the old Lying-in Hospital, now called the Montreal Maternity. Dr. Hector Peltier, who had graduated M.D. at Edinburgh in 1845, was later, in 1847, appointed professor of the institutes of medicine.

As regards medical teaching in Quebec, a meeting of medical students of the Marine Hospital in this city was held as far back as 1835 to discuss the question of medical education, and they recommended that a school of medicine should be established at the Marine Hospital. Lectures appear to have been delivered here in 1837, and a school of medicine, known as the Incorporated School of Medicine of the City of Quebec, was in existence in the year 1847. The Marine Hospital was founded by, and the first president of this school was, Dr. Joseph Morrin. He had been born in Dumfriesshire, Scotland, in 1794, brought by his parents at an early age to Canada, and had afterwards returned to Edinburgh to study medicine. In 1852 the teachers in the Incorporated School of Medicine were formed into the Medical Faculty of Laval University. Out of the original faculty of five professors, one, J. A. Sewell, was an Edinburgh graduate, and became professor of internal pathology and special therapeutics.

With regard to the early development of medicine in Upper Canada, or Ontario, the increase of population following the advent of the Loyalists in the year 1784 occasioned a great shortage of physicians. For many years medical attendance was carried out chiefly by men who had been military surgeons, but many persons practised medicine who were woefully lacking in medical training and knowledge. The Kingston Gazette of 1815 laments that quacks "without one ray of science presume to thrust the created into the presence of the Creator," and in this year an act to license practitioners in physic and surgery was passed, the number of qualified men in Ontario being found to be 36 or 40. A medical board was set up in 1819, of whom the senior member was Dr. James MacAulay, a native of Scotland who had studied at Edinburgh. He was one of the pioneers of York (as Toronto was then called), and took an active part in the development of this town.

With regard to the University of Toronto, the

first attempt to organize a medical school appears to have been made towards the end of 1824 by Dr. John Rolph, who had been a pupil under Sir Astley Cooper in London. This school met with considerable success, but as Rolph had taken part in the Rebellion of 1837 and a reward of £500 had been offered for his capture, it came to a premature end. Dr. Rolph appears to have resumed lecturing in the year 1843, when his school began in earnest. By 1850 there were three schools of medicine in Toronto, the Toronto School of Medicine, the Faculty of Medicine of Trinity College, and the Medical Faculty of King's College, but all in time came to an end and the Faculty of Medicine of the University of Toronto was not reorganized until the year 1887. Heagerty gives a list of 28 medical practitioners residing in Toronto about the year 1850, of whom 6 were Edinburgh men, several being concerned with one or other of the medical schools.

In Nova Scotia, Edinburgh men predominated. Out of 14 practitioners at Halifax in 1845 no fewer than 13 had studied at Edinburgh. The first proposal to establish a medical school was made by the governors of Dalhousie University in 1863. It was strongly advocated by Dr. (afterwards Sir) Charles Tupper, who had graduated M.D. at Edinburgh in 1843. A medical faculty was shortly afterwards formed, and a medical course was inaugurated in 1867. The president of this faculty was William Johnston Almon, a graduate of Glasgow University.

The first medical superintendent of the Nova Scotia Hospital for Mental Diseases, opened in 1857, was James Ratchford de Wolf, who had graduated M.D. at Edinburgh in 1841.

In the year 1854 the Medical Society of Halifax had urged the establishment of a City Hospital, for, up to this time, the City of Halifax and the Province of Nova Scotia do not seem to have had an institution fulfilling the function of a general public hospital. After various delays the first medical staff was appointed in 1866, and the senior visiting physician was Dr. R. S. Black, who had graduated at Edinburgh in 1836, while the senior visiting surgeon was Dr. Charles Tupper.

Dr. Tupper had been born at Amherst, Nova Scotia, in 1821, and proceeding to Edinburgh, took the degree of M.D. with a thesis on "The Mechanism and Management of Parturition, illustrated by a Report of 116 cases." It shows extraordinary energy that a youth of twenty-two should have already attended 116 obstetric cases. Before leaving Edinburgh, he also took the licentiateship of the Royal College of Surgeons, an alternative qualification which many Edinburgh students took in those days without graduating at the university. As early as 1855, he was a member of the Nova Scotia Assembly. In 1862 he was governor of Dalhousie College, Halifax, and in 1867 was president of the Canadian Medical Association. He gradually drifted into politics, was prime minister of Nova Scotia in 1864, and took a great part in the arrangements which resulted in Canadian union. The numerous posts of high office which he held in Canada and his services to this Dominion are too well known to require mention, and he forms one of the best examples of those medical practitioners who have been empire builders.

In New Brunswick, Dr. William Bayard, who had graduated M.D. at Edinburgh with a thesis "On Asiatic Cholera" in the year 1837, conceived about the year 1860 the idea of building a hospital for the care of the poor in the City of St. John. Up to this time, although the population of this city was over 30,000, there was no institution other than the municipal poorhouse where medical treatment could be obtained. He accordingly set about an agitation for the construction of such a hospital, and in 1865 the General Public Hospital of St. John was opened with a medical staff of six physicians and surgeons, of whom two, Edward Bayard, M.D., and T. W. Smith, M.D., were Edinburgh graduates, while a third, Le Baron Botsford, M.D., had graduated at Glasgow.

With regard to medical journalism, the first professional paper to appear in Canada was the *Journal de Médecine de Québec*. This was founded in January, 1826, by Dr. Xavier Tessier, of Quebec, and published both in French and English. Dr. Tessier had as co-editors Drs. Caldwell, Robertson and Stephenson, all of whom were Edinburgh men. *The Montreal Medical Gazette* first appeared in 1845 under the editorship of Drs. Badgley and Sutherland, of whom the former was an Edinburgh graduate. In the same year, the *British American Journal of Medical and Physical Science* was published in Montreal, and continued its existence for seven years. It was edited by Archibald Hall, M.D., and R. L. McDonnell, M.D., of whom the former had graduated at Edinburgh in 1834, and was professor of midwifery in McGill College. This periodical was continued by the *British American Journal* under the editorship of Archibald Hall. In 1852 the *Canada Medical Journal* was founded in Montreal by Dr. R. McDonnell and Dr. Aaron Hart David, who had graduated at Edinburgh in 1835.

In the founding of early Canadian medical societies Edinburgh men seem to have played a special part. The Quebec Medical Society was inaugurated in 1826 with Dr. Joseph Morrin, an Edinburgh man, as president. The Medico-Chirurgical Society of Montreal, formed in 1846, had for its first president A. F. Holmes, M.D. of Edinburgh, and for one of its vice-presidents Francis Badgley, who had graduated at the same university. It is of special significance that when the Canadian Medical Association was formed in 1867, Dr. James A. Sewell, M.D. of Edinburgh, who was president of the Quebec Medical Society, presided at a meeting in Laval University, to which every practitioner in Canada had been summoned, and the first office-bearers of this association to be elected included as president

Dr. Charles Tupper, M.D. of Edinburgh, and among the four vice-presidents two Edinburgh graduates in the persons of Dr. Hector Peltier, of Montreal, and Dr. R. S. Black, of Nova Scotia, with a Glasgow graduate, Dr. Le Baron Botsford, of New Brunswick.

One more advance in medicine which came from Edinburgh to Canada remains to be mentioned. This was the introduction of antiseptic surgery. Joseph Lister was professor of clinical surgery at Edinburgh from 1869 to 1877. During this time numerous Canadians studied in his wards and assimilated his methods. These methods were brought back and introduced at Montreal by Dr. (later Sir) Thomas G. Roddick, to Halifax by Dr. John Stewart, and to Toronto by Dr. Frederick le Maitre Grasett, who had been house surgeon at Edinburgh with Lister in 1874.

Works consulted—List of Edinburgh Graduates from 1705 to 1866, Edinburgh, 1867; Roll of Graduates of the University of Glasgow, 1727-1897, Glasgow, 1898; Heagerty, Four Centuries of Medical History in Canada, Bristol, 1928; American Medical Biographies, Baltimore, 1920.

Association Notes

THE WINNIPEG MEETING

The census of the Medical Registration at the annual meeting of the British Medical Association, held in Winnipeg, in August, 1930, shows a total of 1,602 physicians, distributed as follows:—

Great Britain	303
United States	214
British Columbia	65
Alberta	106
Saskatchewan	207
Manitoba	464
Ontario	184
Quebec	41
Nova Scotia	5
New Brunswick	10
Prince Edward Island	1
Newfoundland	1
Yukon Territory	1
	1,602

With approximately an equal number of ladies and other guests present, the total attendance was something over 3,000.

Hospital Service Department Notes

MEDICAL TOPICS DISCUSSED AT THE ONTARIO HOSPITAL CONVENTION

Problems of considerable interest to medical men occupied the attention of the delegates to the Ontario Hospital Association meeting held at the Royal York Hotel in Toronto early in October. Much of the discussion centred around the medical aspect of these problems, and an unusually large number of medical men were present to participate in these discussions.

One morning was devoted to a symposium on the relation of the mental to the general hospital. Papers were read by Dr. C. B. Farrar, Director of the Toronto Psychiatric Hospital, and Dr. B. T. Ghie, formerly of Orillia, and recently appointed Director of Hospitals for Ontario. The discussion was lead by Dr. C. M. Hincks, Medical Director of the Canadian National Committee for Mental Hygiene. It was pointed out that the general hospital can never meet its responsibility to the sick in the community until it treats all diseases, and, from the view point of the nurse and the medical staff as well, it is highly desirable that certain space be set aside for the treatment of psychiatric patients. This viewpoint was supported in the discussion that followed, although it was emphasized that, owing to the increased cost and inconvenience arising from the care of such patients, the hospitals must of necessity be reimbursed if they assume this additional responsibility.

One afternoon was devoted to the consideration of the medical organization in a hospital, Dr. L. J. Austin, of Kingston, discussing organization from the viewpoint of the large hospital, and Dr. Ward Woolner, of Ayr, the President of the Ontario Medical Association, taking up the small hospital problem. Dr. Austin strongly urged the adoption of compulsory autopsy regulations, pointing out that it was absolutely essential for a better understanding of the causes of death and that despite the great progress made in medical science we shall get nowhere until post-mortem examinations are compulsory in every case, regardless of age, sex, creed or wealth. We are pleased to note that this point received considerable publicity in the lay press. Dr. Austin also defended the presence of the medical student in the teaching hospital. Dr. Woolner in a clear concise manner outlined the ideal organization of the medical staff in a small hospital, reviewing the various activities which such a staff should undertake.

Considerable interest centred about the recent Report of the Royal Commission on Public Welfare, and a review of the principles underlying their conclusions was given by one of the commissioners, Dr. J. M. McCutcheon. This report has already been reviewed in these columns.

At the annual banquet the Honourable W. G.

All communications intended for the Department of Hospital Service of the Canadian Medical Association should be addressed to Dr. Harvey Agnew, Secretary, 184 College Street, Toronto.

Martin, the newly appointed Minister of Public Welfare, a position recommended in the Welfare Report, made his initial address, as did also the Honourable Dr. J. M. Robb, the newly appointed Minister of Health. The latter in the course of his remarks pointed out that Ontario spends 48 millions of dollars on education and only 2 millions on public health. He also called attention to the fact that the discovery of a number of patients in an Ontario Mental Hospital suffering from tuberculosis had led them to undertake a chest study of patients in all the other mental hospitals. At this banquet the Secretary of the Department of Hospital Service spoke on the "Hospital situation in Canada."

Dr. W. J. Dobbie, of Weston, strongly urged the necessity for Government recognition of Nurses' Training Schools as educational institutions where these nurses are being trained to go forth to benefit the public at large. Their education should be borne in part by the state, as is that of the students of other professions.

Dr. Malcolm T. MacEachern not only led the Round Table discussion in his usual vigorous manner but gave an excellent address on "The responsibility of the hospital to the community," reversing the viewpoint so frequently expressed.

Other addresses of interest were those of the President, Mr. R. H. Cameron, the Deputy Provincial Secretary, Mr. H. M. Robbins, Mr. Frederick Lee, M.R.A.I.C., Mr. A. J. Swanson, Superintendent Toronto Western Hospital, Mrs. O. W. Rhynas of the United Hospital Aids Association, a very active organization, and Mr. Chester Decker of the Toronto General Hospital.

A particularly pleasing event at the annual dinner was the presentation to Dr. F. W. Routley, the Honourary Secretary-Treasurer, of a beautiful grandfather's clock in recognition of his valuable services to the Association.

Dr. John Ferguson, Toronto, who has long been active in medical and hospital activities, was elected President for the coming year.

WHAT SHOULD BE THE RATIO OF HOSPITAL PERSONNEL TO PATIENTS?

The problem of knowing how many employees are required to maintain the efficiency of a hospital, bearing in mind the necessity for economy, is a difficult one, especially if deficits are mounting and the suggestion is made to reduce the paid personnel. An exhaustive study of this subject has been made by Dr. M. T. MacEachern, of the American College of Surgeons, and a summary of the findings was presented by him at the recent hospital convention in Vancouver.

This interesting survey was prefaced by a reference to several factors which would modify a comparison of these results with any individual hospital. For instance, older hospitals have a larger personnel for the number of patients served than do the better planned modern hospitals. The improvement nowadays is due not only to the better arrangement of services and to labour-saving installations but to the use of material requiring less upkeep, as, for example, the substitution of terrazo flooring for wood. Also vertical construction requires a smaller personnel than do the older horizontal or the cottage types of construction. An example quoted is the tuberculosis sanitarium at Secaucus, New Jersey. The old buildings, "scattered all over the landscape", housed 195 patients; the compact new building accommodates 500 patients, yet the increase in personnel is but 20 per cent.

Other factors to be considered are the difference in personnel required to nurse chronic and acute cases, the amount of research, the amount of indigent work, and the number of unpaid or voluntary workers in sectarian or church hospitals.

One hundred and ninety-five hospitals were selected as typical, and were divided into five groups according to size. The general average ratio of total personnel (including nurses) is 0.69, or approximately two-thirds of an employee per bed. Considering the average bed occupancy as 75 per cent, the ratio was found to be 0.90, or 9 employees for every 10 patients. The highest ratio, 0.77 per bed, which is the equivalent of 1.06 per patient was found in the middle group (group III—100 to 250 beds), and was almost equalled in group V which is composed of hospitals of 500 beds and over. As most hospitals are not adequately staffed, the opinion was expressed that hospitals for acute cases, at least, should have one or more employees per patient.

The analysis of 1,196 hospitals shows that the proportion of nurses required for each patient decreases as the size of the hospital increases:

Group	*Beds*	*Nurses per patient*
I	25– 49	0.80
II	50– 99	0.74
III	100–249	0.65
IV	250–499	0.54
V	500–over	0.39

But twenty-two hospitals of the 1,196 hospitals studied employ graduates exclusively, the range of ratio being 0.06 to 0.38.

The value of adequate nursing service is illustrated by a comparison of two hospitals in one city, both well equipped, treating the same class of patients and with the same staff of doctors—in one institution where the nursing personnel was 1 to 6 patients the post-opera-

tive death rate was 5.5 per cent; in the other hospital where there was one nurse to every one and one-half patients the post-operative death rate was only 1.8 per cent!

The number of internes per bed increases proportionately with the size of the hospital. The average hospital should have 1 interne to 28 patients. In an "open" hospital this is frequently much lower, that is, 1 to 35 or 40 as a maximum.

In regard to dietitians, taking the group as a whole, the general ratio is about 1 dietitian per 111 patients.

In regard to social workers, conditions vary considerably, but the conclusion is that there should be 1 social worker for every 150 to 200 patients in a mixed hospital caring for free, part-pay and pay patients.

There should be 1 orderly or male attendant for every 25 to 30 patients by day and 40 to 50 by night, and 1 female attendant or ward aide to every 15 to 20 patients.

One physical therapist, attendant or aide, should take care of not more than 16 patients.

The staff required for the x-ray and pathological departments varies so widely according to the size of the hospital and the type of service provided that elaborate sliding scales of requirements have been drawn up and are included in the published paper.

One telephone operator on duty for every 150 to 200 patients might be adequate for the average hospital.

This is an excellent study of this subject. Data in detail, especially concerning the recommended staffs for the roentgenological and the clinical laboratories, may be obtained from the published report which appears in the October, 1930, *Bulletin of the American Hospital Association.*

EIGHT-HOUR DUTY FOR NURSES

The eight-hour system of nursing has been inaugurated in St. Martha's Hospital at Antigonish, Nova Scotia. There has been considerable discussion of this subject in training school circles since it was first introduced in Detroit some forty years ago, but, as with group nursing and graduate nursing, not many hospitals in Canada have actually undertaken the experiment. The results of this study at St. Martha's will be awaited with interest.

Briefly, the advantages claimed for the eight-hour system are: a greater vigour and interest in her work on the part of the nurse; more efficient nursing because of the reduction of the fatigue factor; a greater opportunity for her to relax and mingle with others; reduced sickness among the nurses; higher educational attainments; an increased number of better qualified applicants.

The disadvantages claimed are: that patients are dissatisfied because the nurses are changed so frequently; the increased number of pupils required, necessitating more residence accommodation and more financial outlay; that there are too many unemployed graduates now without increasing the number in training; that the eight-hour day unfits the nurse for the twelve-hour routine required after graduation; that there is apt to be less continuity of nursing service in the wards.

It is well to bear in mind that, from the twelve hours on duty under the present system, there should be deducted two hours for recreation or classes and at least an hour for the two meals, so that the contrast is really between an eight- and a nine-hour day. This might explain why the cost and difficulties of the newer scheme are not so great as feared by some. The chief advantage seems to lie in the separation of the duty period into two portions with a rest period intervening.

STUDIES ON DIGITALIS IN AMBULATORY CARDIAC PATIENTS.—Gold and DeGraff assert that in the average ambulatory cardiac patient with auricular fibrillation and moderate heart failure a much lower "effective concentration" of digitalis in the body suffices to produce full therapeutic effects than is required in the average bedridden patient in advanced congestive failure. The authors have shown that, in the ambulatory patient, full therapeutic effects, as judged by the usual clinical criteria of improvement, can be produced by the daily repetition of a relatively small dose of the drug that can then be continued as the daily maintenance dose without producing toxic symptoms. It is well known that such results cannot be obtained with such small doses in the average patient with far advanced congestive failure; the larger daily doses usually required in these cases cannot be long continued without producing toxic symptoms. In the average ambulatory cardiac patient there is a wide margin between the minimum dosage that produces full therapeutic results and the maximum that can be tolerated without toxic symptoms. This margin is frequently smaller in patients with far advanced failure and the latter often require the largest dosage that can be tolerated in order to produce the best results. It is the accepted practice to use relatively larger doses of digitalis to produce the full therapeutic effects and then relatively smaller daily ones in order to maintain these results for long periods of time. The usual explanation is that the smaller doses are necessary in order to maintain the high "effective concentration" of the drug produced by the larger ones. Evidence has been set forth proving, however, that the "effective concentration" of the drug within the body necessary to maintain the full effects is usually much lower than that required to produce them in the beginning.—*J. Am. M. Ass.* **95:** Oct. 25, 1930.

Provincial Association Notes

ONTARIO MEDICAL ASSOCIATION

NUMBER FOUR DISTRICT MEETING

The meeting of District Number Four, Ontario Medical Association, was held at Hamilton on Wednesday, October 29th. This was held in conjunction with the Clinical Day held annually under the joint auspices of the Hamilton Medical Society and Medical Staff of the Hamilton General Hospital at the Hamilton General Hospital. From every angle both meetings were outstanding successes. The surgical clinics were given by Prof. W. E. Gallie ,of the University of Toronto, who dealt mainly with the treatment of joint and bone injuries and diseases. The clinical material was prepared by a very capable committee under the chairmanship of Dr. O. W. Niemeier. The medical clinics were given by Prof. Russel L. Cecil, of Cornell University, who dealt with pneumonia, arthritis, and lumbago. The clinical material for these clinics was prepared by Dr. R. Y. Parry and his committee. Dr. Parry took part in the discussion on lumbago.

At noon, the visiting doctors were the guests of the Board of Hospital Governors for luncheon, which was served in the nurses' dining room of the hospital. Short addresses were made by Dr. F. B. Bowman, President of the Hamilton Medical Society, and by His Worship Mayor Peebles. The clinics were excellently given and were attended by nearly two hundred and fifty physicians.

The evening dinner and meeting was held at the Royal Connaught Hotel, and were in charge of District No. 4, Ontario Medical Association. The Counsellor, Dr. W. K. Colbeck, of Welland, was in the chair. Professor Cecil gave a short and interesting address on medical education in the United States. Dr. Ward Woolner, President of the Ontario Medical Association, gave a lucid address on matters pertaining to the work of the Association, followed by the secretary, Dr. T. C. Routley. The guest of the evening, Honourable W. G. Martin, M.L.A., Minister of Public Welfare of the Province, in a stirring address, outlined the scope, aims, and ideals of his department, referring especially to social welfare work, among the underprivileged children of the province. A vote of thanks to the speaker was moved by Dr. Binns, of Welland, and heartily accorded. The meeting was one of the best held by District No. 4, and was attended by nearly one hundred and twenty-five physicians.

Great credit must be given to Dr. Bowman, Dr. Colbeck, and the numerous workers on committees who contributed to the success of the day. During the evening, Drs. Colbeck, of Welland, and Mahony, of Niagara Falls, were nominated as Counsellors and Dr. P. B. Macfarlane of Hamilton, was nominated as Vice-Counsellor.

The Hamilton Medical Orchestra rendered an excellent musical program.

THE ANNUAL MEETING, DISTRICT NUMBER SEVEN

The annual meeting of District Number Seven of the Ontario Medical Association was held in the Richardson Amphitheatre, Kingston, on Thursday, October 23, 1930, with an attendance of 105.

The first speaker on the program was Dr. R. R. MacGregor, of Kingston, who spoke on "Observations on the recent intestinal influenza epidemic." A number of clinical cases were then presented by Drs. L. J. Austin, W. A. Jones, Bruce Hopkins, and W. T. Connell, of Kingston. The visiting speaker was Dr. David Smith of Raybrook, N.Y., who gave a very interesting address on "Non-tuberculous pulmonary disease." Dr. John Wyllie, Professor of Preventive Medicine, Queen's University, spoke on "Epidemic encephalitis", after which the meeting adjourned to Ontario Hall, where Dr. Wyllie showed a film illustrating the Parkinsonian syndrome of epidemic encephalitis.

At 7.30 p.m., the annual dinner was held at the Badminton Club, Kingston, after which brief addresses on matters relating to medical organization were given by Dr. Ward Woolner, of Ayr, and Dr. T. C. Routley, of Toronto, President and Secretary, respectively, of the Ontario Medical Association. The speaker of the evening, Dr. B. T. McGhie, Director of Hospital Services for Ontario, then outlined the work to be undertaken in the establishment of mental health clinics throughout the province, and other matters pertaining to his department.

At the business session, Dr. W. A. Jones, of Kingston, was nominated Counsellor, and Dr. Wm. Gibson, of Kingston, was elected Vice-Counsellor of the District for the ensuing year.

THE ONTARIO NEURO-PSYCHIATRIC ASSOCIATION

The fall meeting of the Ontario Neuro-Psychiatric Association was held at the Ontario Hospital, Mimico, November 14, 1930. Papers were read by Dr. D. R. Fletcher, Assistant Director of Ontario Hospitals, Dr. W. G. Ferguson, Director of Child's Guidance Clinics, Niagara

Falls, N.Y., and a clinical case presented by Dr. K. McLean, Assistant Physician, Ontario Hospital, Mimico.

The banquet was held in the hospital dining room and Dr. Clare, President of the Association, introduced Hon. Dr. J. M. Robb, Minister of Health. Dr. Robb spoke very highly of the work that had been done in the Ontario Hospital service and expressed his willingness to assist in every way to make the Ontario Hospitals the best in the world.

The officers for 1931 are as follows: *Honorary President*—Hon. Dr. J. M. Robb; *President*—Dr. J. J. Williams; *Vice-president*—Dr. B. T. McGhie; *Secretary*—Dr. George C. Kidd.

Executive committee.—Drs. F. S. Vrooman, Ontario Hospital, London; C. S. Tennant, Ontario Hospital, Woodstock; T. D. Cumberland, Ontario Hospital, Kingston; Geo. Boyer, 145 College Street, Toronto; G. H. Stevenson, Ontario Hospital, Whitby; G. W. Horne, Ontario Hospital, Orillia.

Medical Societies

THE HALIFAX MEDICAL SOCIETY

The Halifax Branch of the Medical Society of Nova Scotia opened the session of 1930-31 by a dinner-meeting at the Lord Nelson Hotel on the evening of October 15th. The President, Dr. W. L. Muir, delivered his presidential address, in which he reviewed most interestingly the history of anæsthesia from the time of Adam's deep sleep. He referred to the first use of chloroform in Nova Scotia in March, 1848, when J. D. B. Fraser, a chemist of Pictou, administered chloroform of his own making to his wife in her confinement. Very shortly afterwards chloroform made by Mr. Fraser was used in Halifax in amputation cases under Dr. Wm. J. Almon, who became a member of the Senate of Canada at the time of Confederation. Dr. Muir's address abounded in anecdote and appropriate quotations from literary men.

A clinical meeting of the Halifax Branch of the Medical Society of Nova Scotia was held at the Victoria General Hospital on October 29th. The session was devoted to the presentation and discussion of surgical cases. Dr. H. K. MacDonald dealt with surgery in the diabetic.

Dr. W. Alan Curry showed a case in which the patient had been intensely jaundiced owing to blocking of the common duct by a stone, in which it was necessary to restore coagulation time to normal before he operated.

Dr. Frank Mack discussed intravenous pyelography, demonstrating films of cases in which he had used uroselectan.

Dr. N. H. Gosse presented a case of biliary colic in which there had been reason to diagnose malignancy. At operation he had found advanced malignancy of the gall bladder, with extension into the liver.

Dr. C. E. Kinley demonstrated a case of hæmophilia. Profuse bleeding had followed extraction of a tooth, which could not be controlled by hæmostatics. Repeated transfusions gave a satisfactory result. A brother of the man had died from loss of blood.

Dr. Victor Mader reported a case of cancer of the hepatic flexure with a diverticulum of the duodenum. X-ray films in this case were shown by Dr. Johnston, who explained their utility in determining malignancy and demonstrating the diverticulum.

W. H. HATTIE

CALGARY MEDICAL SOCIETY

At the meeting of the Calgary Medical Society, held on October 14, the members were addressed by Dr. C. A. Baragar, the recently appointed supervisor of all the mental institutions in the province. His lecture which was of much interest was on "Mental abnormalities and their mental and social relationships".

In his opening remarks, the speaker dealt with a consideration of the progress which had been made in recent years in our knowledge of mental diseases, as well as with the problems involved and the nature of such diseases. At the present time, the greatest need is for adequate education of the public concerning mental diseases, and the great avenue of instruction should be through the medical profession. He stated that in Canada there are more beds (30,000) occupied by mental patients than by patients in general hospitals. It is astounding that there should be so many families throughout the land, in which there are one or more individuals suffering from mental illness and causing distress to the relatives. No man or woman is so strong that he or she will evade mental disease. There is a stigma attached to one suffering from mental complaint and everyone should be particularly interested in an endeavour to remove this. There should be no fear of disgrace for a man or woman to apply to a mental hospital for admittance. Patients often frankly admit that they should be admitted early, yet are fearful

of the disgrace. Insanity is a legal term meaning unsoundness of mind. The legal element enters largely because the patient does not know the difference from right and wrong. Dr. Baragar's definition of insanity is a good broad one, namely that a patient so affected is one who is not making a reasonably satisfactory adjustment to life. There is a mental disturbance of personality. The number of different kinds of insanity is a large one.

There are several classes of mental breakdown.—

Those due to organic disease of the brain produced by senile arterial changes. Some develop senile changes early, others later in life. This group comprises about 18 per cent of the insane. With such patients the disease is not curable.

The second group is a small one comprising 3½ to 4 per cent of cases, including general paralysis of the insane and cerebral syphilis. These patients are nearly all incurable. There has been a great improvement since the introduction of malarial inoculation, but it is doubtful if there ever is complete recovery. Treatment should be instituted early and tryparsamide should be used as well as malarial inoculation. Under such conditions quite a number will make a good readjustment.

Group three is associated with brain tumour, encephalitis, meningitis, or brain trauma, and is a small one, comprising only about 4 per cent of mental cases.

Group four includes the toxic psychoses, due to toxins within the body or poisons introduced from outside, such as morphin, heroin, alcohol. In the former are bodily diseases associated with toxic states. Nearly all drug addicts relapse. The treatment is notoriously unsatisfactory. The alcoholics give more satisfactory results.

The fifth group includes the epileptics, about 6 to 7 per cent of the total. Psychoses may develop. Where there is organic disease of the brain there is only slight hope of benefit through treatment. Some remain stationary, some improve. With early treatment the chances of success are greater.

In group six are the personality disturbances, with no organic basis for the disease. There may be a conflict or emotional disturbance. There are four types in this group: (1) the manic depressive includes some of the most difficult patients to care for, yet many of them get better in ninety days. Some take two to three years. These patients are mentally depressed, and may be gloomy for weeks and then recover completely. With some, on the other hand, the disease may become chronic. The involutional depressants associated with this type are of an average age of forty-eight years, but may vary between thirty-eight and sixty-two years of age. They occur at periods of a change in life. In the latter years of middle age, human beings have to make a readjustment of their ways of living. This throws an extra strain on the personality of the individual. Where the patient recovers this is a hopeful type. There may be a suicidal tendency and the disease may last four or five years. (2) Another type in this group is the dementia præcox. The individual takes satisfaction out of a gloomy life, and in addition leads a sedentary existence and develops hallucinations. This type is difficult to treat and only 10 to 15 per cent recover. It develops in the late 'teens or early twenties and rarely in the thirties or forties. There is a mental deterioration. It may be said that such patients are stranded on the rock of poverty and are unable to face the difficulties of life. The individual is sensitive and seclusive and suspicious of others. Most of such cases have a relapse. Twenty-eight per cent of mental cases are of this type. (3) Still another type in this group is the paranoiac. There is here no mental deterioration, as in dementia præcox. The individual develops hallucinations, believing that people are plotting against him, or, he may consider himself a special personality, such as God. Patients of this type may never enter a mental hospital. They are usually harmless, and it is uncommon for them to develop homicidal tendencies. They comprise about 4 per cent of mental cases. This whole group is about 48 per cent of mental hospital admissions. (4) The last group includes the mental defectives, which accounts for 10 per cent of mental cases. The mentally deficient include those with psychopathic personalities. These cases date from early age. They behave abnormally, are unusually cruel, are pathological liars or thieves. They may be unusually bright. The majority of such patients do not go to a mental hospital. Among them are certain types of reformers, while a number develop anti-socialistic behaviour.

What can we do about all these cases of psychopathic personalities? A survey of the jail at Fort Saskatchewan, Alberta, showed a large number of those mentally deficient. The care of this class of cases is either a municipal or a governmental affair. The state cannot look after them unless there is an intelligent public opinion behind it. An adequate attempt has been made in Alberta to deal with the situation. Such patients should be taken care of in a mental hospital for a sufficient period of time to study and treat them. This is an active treatment problem and they should have the best medical and nursing attention. An attempt should be made to secure complete recovery

without a mental scar, and the patients should be able to obtain suitable work and so get on their feet. Another problem is with the mental defectives. It has been estimated that 2 per cent of school children are mentally defective. Low in the scale are the imbeciles, while among the higher grades are the morons. A great many of the latter type can be returned to outside life, where they make a readjustment to their way of living. Mental hygiene clinics associated with our public schools will help us to find out the early cases of those mentally defective. Where there are problem children in schools we can learn to correct their disabilities. The speaker commended the work being done in Toronto along these lines.

G. E. LEARMONTH

University Notes

University of Toronto

The Opening of the Banting Institute

The Banting Institute of the University of Toronto was formally opened on Tuesday, September 16, 1930, by Lord Moynihan of Leeds. The program of the proceedings included the opening ceremony in Convocation Hall, inspection of the buildings, a special convocation for the conferring of honorary degrees, a reception and garden-party, and an official dinner.

At the formal opening the Chairman of the Board of Governors, the Hon. and Rev. H. J. Cody, described how the Banting Institute had come to be built with funds amounting to $935,000, secured from the Provincial Government of Ontario, the University of Toronto and the Toronto General Hospital for replacement of the present pathological building. Ten years ago, the Faculty of Medicine drew up an outline of the additional buildings that would be required to provide adequate facilities for teaching and research purposes, and, with the completion of the Banting Institute, the ideals set forth at this time had now reached their consummation.

Banting Institute

The new Institute is located on the north side of College Street opposite the Toronto General Hospital, with which it is connected by an underground tunnel. The structure is of reinforced concrete faced with red brick and trimmed with Indiana limestone, the architecture being of the Georgian type. There are five stories above a basement and sub-basement, with passenger and freight elevators. The main floor is occupied largely by the department of pathology, with a group of five rooms for routine pathological examination of material from the General Hospital, and with a large departmental library.

In the east wing is situated the lecture theatre for 200 students, in which provision is made for lantern projection or moving picture demonstration. The Department of Bacteriology occupies the second floor with a large laboratory for 150 students, which will be utilized for both bacteriology and pathological histology. The third floor is assigned to the clinical departments of Medicine, Surgery, Obstetrics and Gynæcology and to a library of books and journals. Here is hung a portrait of Lord Lister. On a mezzanine floor between the third and fourth floors, is a students' laboratory for the teaching of pathological chemistry and clinical microscopy, which will accommodate about 150. On the fourth floor, the laboratories of the department of pathological chemistry are located. The facilities for the various workers under the Banting and Best Chair of Medical Research are situated on the fifth floor, with complete operating rooms and their accessories for Experimental Surgery in the west wing. Two rooms are used by the Art Service of the Faculty, where drawings, paintings and wax models are prepared.

Animal quarters for the various departments in the building are located on the roof of the west wing. The basement floor is devoted to a large number of small museum rooms, in each one of which are shelved the gross pathological specimens of the various body systems. The autopsy room, with seats for 120 students, is in the east wing, where the morgue is also located.

After the introductory address, Dean Primrose introduced the university representatives, who advanced as their names and universities were announced and shook hands with the Chancellor and the Chairman of the Board.

Lord Moynihan then delivered the formal

address, declared the building open, and unveiled the portrait of Lord Lister, just referred to, which was presented to the university by the late Dr. F. LeM. Grasett, formerly Emeritus Professor of Surgery in this university, and Dr. H. St.G. Baldwin, both of whom were former house-surgeons of Lister at Edinburgh. At the end of the proceedings, everyone repaired to the Banting Institute on College Street, where Lord Moynihan unlocked the door and declared the building open for inspection.

At one o'clock, the members of the Faculty Council entertained at a buffet luncheon in the bacteriological laboratory, the representatives from other universities, the members of "Tour C" of the British Medical Association, on their way back from the annual meeting of the association in Winnipeg, and a number of out of town graduates and guests.

In the afternoon a Special Convocation was held in Convocation Hall for the conferring of honorary degrees. In presenting for the degree of LL.D. the Rt. Hon. Lord Moynihan, K.C.M.G., C.B, M.D., M.S., P.R.C.S., LL.D., Leeds, the Dean of the Faculty of Medicine, Dr. A. Primrose, referred to the distinguished services rendered by his Lordship in war and in peace. "Lord Moynihan", he said, "holds the rank of honorary major-general of the British Army, and during the war acted as consulting surgeon for the forces overseas. He was particularly noted for his treatment of heart and lung injuries suffered by soldiers. He himself is the son of Captain Moynihan, V.C.

"In addition to his post as President of the Royal College of Surgeons, he is an Emeritus Professor of Surgery in the University of Leeds and Consulting Surgeon to the Leeds General Infirmary. He already holds degrees from the Universities of Leeds, Edinburgh, Bristol, Ghent, Dublin and Belfast.

"Recognized the whole world over as one of the most outstanding surgeons, his Lordship's books constituted the best guide for the practice of surgery in many languages."

Thomas Stephen Cullen, M.B., Professor of Clinical Gynæcology of Johns Hopkins University, a distinguished graduate of Toronto University and a Silver Medallist (1892), was presented by Prof. W. B. Hendry, for the degree of LL.D.

Charles Seward Blackwell, Chairman of the Board of Trustees of the Toronto General Hospital, was presented for the same degree by Sir Joseph Flavelle, Bart.

The degree of Doctor of Science was conferred upon Davidson Black, M.A., M.B., *in absentia*, his name being presented by Prof. J. P. McMurrich. Dr. Black had attained world-wide renown on account of his anthropological studies in China.

Lord Moynihan expressed his appreciation of the honour which had just been conferred upon him. He paid a high tribute to the Medical School of the University of Toronto, declaring that the school here stood very high among the medical schools of the world to-day. It attained this position by virtue of its splendid team work and the willing and substantial aid of the lay district which it served. It was appropriate, he thought, that one of the greatest medical discoveries since the day of Lord Lister should have its home here.

As President of the Royal College of Surgeons, he referred to the conducting of the primary examinations for the Fellowship in Toronto and Montreal in the last two years as a means of obviating the expense to candidates of two trips to the Old Country, a thing which he never could have afforded when he was a medical student. He outlined the plans which were being forwarded in England for the accommodation of post-graduate students from the Dominions, noting that a recent grant had been made by the Government for a post-graduate teaching college, which is to be opened in Hammersmith, London. He also expressed the hope that the plan of establishing a "Canada House" in Bloomsbury would be consummated so that students from the Dominion would feel that it is their own little bit of London. In a stirring peroration, he paid a glowing tribute to Dr. Banting and the benefit he had conferred upon humanity by his discovery.

Dr. T. S. Cullen, in responding, recalled many interesting reminiscences of the early days of the Medical School of the University of Toronto.

Mr. C. S. Blackwell said he wanted to thank the Chancellor and Senate for the great honour they had done him. He felt that they wanted to pay recognition to the hospital and its Board of Trustees and show appreciation for what they had done. "When the University of Toronto has to-day honoured me with this degree of Doctor of Laws, my cup of gratitude is overflowing."

Immediately after the Convocation a reception and garden party were to have been held in the Quadrangle of University College, but as an unexpected rainstorm came on, arrangements had to be made to carry out this event in the entrance hall and corridor of University College. After a brief delay, guests were received by the Chancellor, Sir William Mulock, the Hon. and Rev. H. J. Cody, and Dr. F. G. Banting. Refreshments were served with some difficulty, but everybody understood the unforeseen disturbance of arrangements and enjoyed the picnic character of this feature of the program.

In the Great Hall of Hart House, the Board of Governors of the University entertained at

Dinner the recipients of Honorary Degrees, the delegates from other universities and medical colleges, members of the British Medical Association (Tour C), representatives of the Provincial Government, the City of Toronto, Medical Associations and Licensing Boards, Trustees from Hospitals, the Heads of other Faculties and Colleges, and the Faculty of Medicine. The Hon. and Rev. H. J. Cody, Chairman of the Board of Governors, presided.

After the toast to the King, Lord Moynihan of Leeds proposed the toast to the University of Toronto, which was responded to by Dean A. Primrose. The toast to Sister Universities was proposed by Professor W. E. Gallie, Head of the Department of Surgery and responded to by Professor Robert Muir, Professor of Pathology at Glasgow, on behalf of the British Universities; by Professor F. P. Gay, Professor of Bacteriology at Columbia University College of Physicians and Surgeons, New York, on behalf of the United States Universities; and Prof. J. C. Meakins, Professor of Medicine, McGill University, on behalf of the Canadian Universities.

Professor Duncan Graham, Professor of Medicine, proposed the toast to Our Guests, which was responded to by Prof. Arthur H. Burgess, immediate Past-President of the British Medical Association; by Col. Sir William Taylor, President of the Royal Academy of Medicine in Ireland; by Dr. Robert Hutchison, Royal College of Physicians, London; and by Sir Ewen MacLean, Past-President of the British Medical Association.

Professor J. C. B. Grant, for ten years head of the Department of Anatomy in the University of Manitoba, has been appointed head of the Department of Anatomy at the University of Toronto, to succeed Prof. J. P. McMurrich.

Professor Grant graduated from the University of Edinburgh in 1908 and holds the degree of M.B., Ch.B., with honours, as well as the F.R.C.S. Edinburgh. He has been on the staff of the University of Edinburgh as well as that of the School of Medicine, Durham University, Newcastle-on-Tyne, England. Because of his distinguished service at the war, he was awarded the Military Cross.

Prof. James Playfair McMurrich, who has been Professor of Anatomy at the University of Toronto since 1907, has resigned, and the title of Professor-Emeritus has been conferred on him.

Professor Herbert A. Bruce has also resigned, after being on the staff of the Department of Surgery since 1897. He has also had the title of Professor-Emeritus conferred on him.

Professor J. G. FitzGerald has been appointed a member of the Health Committee of the League of Nations, and one of the four "public health expert assessors" of the Committee. The appointment is for a period of three years from July 1, 1930. The first meeting of the new Health Committee took place on September 29th and lasted for a week. Dr. FitzGerald sailed on the *Lafayette* from New York, on September 18th, to attend this meeting and has now returned.

Dr. E. Stanley Ryerson, Secretary of the Faculty of Medicine, Toronto University, acted as the representative of the Faculty at the annual meeting of the Association of American Medical Colleges held at the Medical School of the University of Colorado in Denver, October 14, 15 and 16, 1930.

E. STANLEY RYERSON

University of Manitoba

The contract for the new University Arts building to be erected on the Manitoba Agricultural College site, close to the Red River, was awarded on October 2nd, to the Claydon Company at $416,741.00. The building will measure 220 feet by 65 feet and will be built of Tyndall stone, of rough quarry finish for the outside walls and smooth stone for trimmings. Of Gothic design, the new edifice will be four storeys in height surmounted by a central tower. Above the main entrance will be a large bow window, two storeys high, to light the faculty room and library. Manitoba marble will be used for the entrance hall and the staircases. Regina Crescent is being widened and paved so as to give easier and more direct access to the group of college buildings. The architects, Prof. A. A. Stoughton and Mr. Gilbert Parfitt, have already provided for the completion of the heating tunnel.

There have been a number of changes in the Faculty of Medicine. Dr. Harvey Smith has resigned as Professor of Ophthalmology and has been appointed Professor-Emeritus. He is succeeded as professor by Dr. Herbert Bell. Prof. J. C. Boileau Grant has resigned as head of the department of anatomy to become head of the similar department at Toronto. Assistant-Professor Donald Mainland has become Professor of Anatomy at Dalhousie University. Dr. Joseph L. Jackson has been promoted to be senior assistant professor and acting head of the department. Dr. G. I. Boyd has been appointed second assistant professor. ROSS MITCHELL

Students' Hall of Residence at St. Andrews

With the opening of the present term a hall of residence for men students has been established at St. Andrews University. The new St. Salvator's Hall stands to the north of the Younger Graduation Hall, and is built in three wings, each of four stories, in a Scottish architectural style. There is a common room, and a dining hall with dais and high table; each student is provided with a combined sitting-room and bedroom. The hall has been erected out of a gift of £100,000 which was sent in 1927 by Mr. Edward S. Harkness, of New York, to the University of St. Andrews in order to develop collegiate life in this university. The same donor recently presented to Great Britain a sum of approximately £2,000,000 to be devoted by five trustees to charitable purposes, in recognition of the manner in which Great Britain has borne her burden since the war, when she spent her resources freely in the common cause. It may be recalled that he also provided the funds for the Commonwealth Fund Scholarships, by means of which thirty British graduates are sent every year to the United States in order to spend two years of study and travel under generous conditions. Under the present scheme of St. Salvator's Hall at St. Andrews, some £40,000 is to be devoted to providing residential scholarships, and the holders of these will be required to live in Hall. The scheme aims at reviving the mediæval system that prevailed in St. Andrews University, where some other attempts have already been made, not always with success, to establish residential halls. The women students at this university already have a residence in University Hall, which was built at the end of the last century; it has proved so popular that it has several times been expanded. The old system of regents has been revived. Each scholar, or any other student who desires it, will be attached to a regent—a member of the staff—who will act as a guide and adviser to him; unlike the tutors of the English universities, however, he will not supervise his students' work.

University of Sydney

The Senate has announced that the Rockefeller Foundation has decided to contribute £100,000 to provide laboratory facilities for the departments of medicine, surgery, pathology, and bacteriology. The recent establishment of full-time Bosch chairs in medicine, surgery, and bacteriology has brought the medical school of the University within the scope of the activities of the Foundation. It is the intention of the university to build a new block close to the Royal Prince Alfred Hospital. The present medical school will continue to house the departments of anatomy, physiology, pharmacy, and dentistry. The new block will take in the departments of medicine, surgery, pathology, and bacteriology as well as departments which have already been endowed.

KING'S COLLEGE HOSPITAL.—On the recommendation of the medical board, and by a unanimous vote of the general committee, King's College Hospital, London, has decided to readmit women students to its medical school. They will be admitted, in limited numbers, from October next, the beginning of the school year. Mr. C. E. Bedwell, the house governor, states that the action taken by King's College Hospital in 1928, whereby women students were excluded, was simply a protective measure, because it was feared that the closing of other hospital doors to women might result in an undue invasion of women at Denmark Hill; it was never regarded as an irrevocable step, but only as temporary and experimental. The objections to co-education which have been urged in some quarters, such as the supposed embarrassment felt by professors in teaching certain aspects of medicine to mixed classes, or the distraction of men students by the introduction of the feminine element, have not been experienced at King's College. This action brings the number of London hospitals which admit women medical students up to three. The Royal Free Hospital (London School of Medicine for Women) admits women only, and in addition University College Hospital admits women to a limited number of vacancies, not more than twelve each year, making between thirty-six and forty-eight women studying there at any one time. Some of the great teaching hospitals of London have always barred women students; in others the ban has been recently imposed, and in some of these a few women students who joined earlier are still working out their time. London is more conservative in this respect than the provinces, where co-education is the general rule. From statements made in the press by those entitled to speak for other teaching hospitals, it does not appear that the example of King's College Hospital is likely to be followed immediately, but the action of King's gives point to a remark in our recent Educational Number that such a state of affairs as the ban upon women in the London medical schools can only be temporary.—*Brit. M. J.* Nov. 8, 1930.

Special Correspondence

The Edinburgh Letter

(From our own correspondent)

One of the interesting facts disclosed by the annual report for 1929 of Dr. William Robertson, the retiring Medical Officer of Health, is that for one year at least the population of Edinburgh has decreased. The present number is 427,538. This is 916 fewer than it was in 1928, and some would have us believe that the city is already in a state of decline. The present situation is accounted for largely by the birth-rate which was the lowest since 1918. At the same time the movement of population due to emigration has also been a contributing factor. Edinburgh has never been predominantly an industrial city, liable to sudden increases in its population, through the starting of new industries. Two hundred years ago the population was 40,000, closely packed together within the confines of the "Old Town" an area less than a mile square. The increase in the population has been slow but steady. Expansion has been mainly due to extension of the city boundaries. The latest was in 1921 when the population rose from 314,193 to 420,264. New housing schemes and modern ideas of health have been responsible for a considerable redistribution of the population. There is a tendency to move to more suburban districts, while in the more congested areas of Central Edinburgh and Leith the population has greatly decreased, due to the effect of slum clearance schemes. While the total population has declined, it should not be forgotten that in 1929 there were 1,379 more inhabited houses in the city than in 1928. Edinburgh's birth-rate of 17.1 for 1929 is the lowest rate among the eight largest towns in Scotland. At the same time the death-rate has increased to 15.1, the highest since 1922, and the infantile mortality is 80.

The French Ambassador, Mr. A. de Fleuriau, unveiled a bust of Dr. Philipe Pinel on September 26th, at Jordanburn Mental Hospital, Edinburgh. This was the centenary of this physician's death. In 1793, at the Bicêtre Hospital in Paris, Pinel removed the chains that bound 53 of his insane patients. In order to do this he had to ask the permission of the National Convention during the middle of the Reign of Terror. That Assembly very grudgingly gave its consent, as the Committee of Safety believed that Royalists were being concealed in the asylums. Besides removing chains, Pinel introduced various innovations to ameliorate the condition of the insane. He provided suitable buildings, warm clothing and good food. He made careful medical examinations the rule. One of the results of this improvement in methods of investigation was the discovery by one of his pupils—Esquirol—of the symptoms of the disease known as general paralysis of the insane. When the Edinburgh Hospital for the Insane, proposed by Dr. Andrew Duncan in 1790, was opened for the reception of patients in 1830, it was conducted on lines laid down by Pinel at Paris and William Tuke at York. Another link uniting Pinel to Edinburgh is that he translated into French the works of the illustrious William Cullen, Professor of Medicine at Edinburgh University.

Interesting facts regarding the growth of the National Health Insurance in Scotland emerged at the Annual Conference of Insurance Committees which was held at Inverness on September 26th and 27th. The number of prescription forms under the scheme in Scotland during 1929 was 2,925,662, an increase of 269,952 over the 1928 total, and a record. The increase was due largely to the influenza epidemic. The value of the prescriptions was £160,424, an increase of £13,096 over 1928. The cost of the epidemic is calculated at £10,000. The average price of each prescription was 13.16 pence. Several instances of costly treatment are given. One person in the period 1925-30 has been supplied with ointment to the value of £77. From May, 1929, to June, 1930, another received insulin and liver extract costing £77. One of the first patients to receive insulin treatment and who is still being treated has cost in all £286.

The Annual Report of the Research Laboratory of the Royal College of Physicians has been issued. The Curator, Sir Robert Philip, pays a tribute to the service rendered by the various members of staff during what has been a busy year in the various departments of the laboratory. The Freeland Barbour Fellowship for the period 1927 to 1929 has been awarded to Dr. J. S. Fraser, F.R.C.S., for his researches on the pathology of the ear. Twenty papers have been published from the laboratory. During the year twenty-one workers have been engaged in research. Their investigations relate severally to pathological, bacteriological, chemical, physiological and statistical problems. A large number of researches, conducted over a considerable period, has reached completion during the year. This applies particularly to the results of team work which has run on for some years, *e.g.*, the investigation of Drs. Charles

McNeil, A. R. Macgregor, W. A. Alexander, and Lt.-Col. W. Glen Liston, on "The pathology and bacteriology of the pneumonias of childhood," which has been recorded in a series of six communications to the Archives of Diseases in Childhood. The Research on the Standardization of Tuberculin, completed last year, will be published in the forthcoming number of the *Journal of Hygiene*. This was initiated by the Curator in concert with Professor T. J. Mackie, as a consequence of the Regulations relating to the Therapeutic Substances Act of 1925. The Superintendent, at the request of the Health Organization of the League of Nations, has prepared and submitted a report upon statistics of treatment at various antirabic institutes. Returns have been received from 31 institutions relating to 31,656 treated persons. It is hoped that in future years a larger proportion of the institutes of the world (estimated at about 96) will submit returns. Interesting work on chemotherapy has been carried out by a number of investigators. Various organic substances have been synthesized by Mr. J. F. Smith, Dr. W. D. Kermack, Mr. Muir, and Dr. R. H. Slater. These have been tested by the Chemotherapy Committee of the Medical Research Council as to their antimalarial action. The chemical aspects of this work are of considerable interest, and these have been submitted by Dr. W. O. Kermack and Mr. J. F. Smith to the Chemical Society for publication. The very large number of reports issued by the laboratory is noteworthy. During the year no fewer than 14,798 were prepared. These involved 3,358 histological examinations, 9,094 bacteriological and 2,346 chemical.

The Royal Faculty of Physicians and Surgeons of Glasgow has recently conferred its Honorary Fellowship on four distinguished medical men—Robert Muir, F.R.S., Professor of Pathology in Glasgow University; Lieut-Col. Laurence Austine Waddell, C.B. of the Indian Medical Service, the well-known ethnologist and archæologist; Prof. Karl Friedrich Wenckebach, of Vienna; and Dr. W. L. Reid, formerly Professor of Midwifery and Diseases of Women at the Anderson School of Medicine, Glasgow.

Dr. J. Woodburn Morison, Lecturer in Radiology at the University of Edinburgh, has been appointed Professor of Radiology in the University of London, and Medical Director of the Radiological Department of the Cancer Hospital, Fulham. This is the first Chair of Radiology to be established in Great Britain. The institution of the Chair marks an advance in the recognition of radiology by the universities, as the subject is now placed on the same plane as other branches of medicine in the London University curriculum. Dr. Morison is an M.D. of Glasgow University, and a Fellow of the Royal College of Physicians of Edinburgh. He came to Edinburgh five years ago to establish the new radiological department in the Royal Infirmary, which is one of the foremost in these islands.

At the meeting of the Royal College of Surgeons on October 15, James Haig Ferguson, M.D., LL.D., was re-elected *President* for the ensuing year; Alexander Miles, M.D., LL.D., *Vice-president;* and John William Struthers, F.R.C.S.Ed., *Secretary-Treasurer*.

GEORGE GIBSON

23 Cluny Terrace, Edinburgh

The London Letter

(From our own correspondent)

As has been indicated in previous letters written about this time of year the first week of October sees each of the several medical schools welcoming new students by means of a public meeting of old students, relatives and friends (to say nothing of subscribers to the hospital funds, actual and potential). At this meeting some public man or woman, a "leader" of our profession or of some other profession, delivers an address which may or may not have anything to do with the new students. What youths of sixteen or seventeen just leaving school can have made of the fare served out to them this year it is difficult to imagine. Lord Moynihan, under the title of "Surgery in the immediate future," told the assembly at Guy's Hospital what he thought of physiologists, particularly as regards "hominal physiology" and he helped to dot the "i's" and cross the "t's" of recent attacks on the Medical Research Council. Dr. Izod Bennett, Dean of the Middlesex Hospital Medical School, took occasion to remark on some of the defects in the education of the average English schoolboy who was proposing to become a medical student. He thought him deficient in both science and classics. Lord Riddell, as one of the lay speakers this year, explained to the students at St. George's Hospital some things that matter for doctors from a layman's point of view. He was particularly scathing about panel (or insurance) practice, which he considers only saved from breaking down as a system by the work of the so-called voluntary hospitals. He enunciated several points in the education of the doctor which were valuable; the searching medical eye must be cultivated despite modern improvements in diagnostic means; the body must be viewed as a whole; a clear, concise method of expression should be cultivated for communication purposes; the student should pay attention to methods of giving evidence; he should strive to get continuity into his work; and, lastly, should learn how to use statistics, graphs and curves. It is not always that a layman gives such useful advice to a medical audience. Tact, punctuality, a sense of humour and self-

organization were some of the less original things he advised students to cultivate.

Gauvain and Alton are two names which spell hope for the cripple, and the Treloar Cripples' Home has just come of age. It was in 1908 that Sir William Treloar, then Lord Mayor of London, discovered at Alton (not far from Southampton) a group of bungalows which had served as a hospital for wounded men after the South African War. He seized the opportunity to start his Cripples' Home and during the twenty-one years which have elapsed since it was opened more than 5,000 children have passed through the Home with a recovery rate of about 90 per cent, and an average stay of about a year. Devoted at first almost entirely to tuberculous spine, hip and knee cases, the scope of the hospital has been extended to general orthopædic cases and now works in conjunction with a large orthopædic scheme for the county. Gauvain's work on tuberculosis is known all over the world. Patients are eligible from any part of the British Empire, and post-graduate classes held annually are widely attended. With the coming of age the use of the old timber buildings is curtailed, for a year ago rebuilding of the hospital was begun and the first of the five new blocks is now ready for occupation. Each ward unit contains 60 beds with folding doors on the south, so that each ward can become an open-air gallery, and administrative, operating, treatment and other aceessory rooms lie to the north. Treloar's name, coupled with Gauvain's, will always be remembered for their devotion to the crippled child, and Alton, in its new form, will continue to attract students of common-sense simplicity from all over the world.

The subject of shortsightedness in the educational world has nothing to do with any particular policy enunciated by any particular government. Myopia is especially difficult to deal with in schools, because more information is needed about its cause, course and treatment among school children. A recent report on a group of London children, observed over a long period, helps to throw some light on this. It is found that myopia tends to progress at a rate of just under half a dioptre per eye per year and it is clear, though unexplained, that myopia is most frequent in those schools were competition for scholarships is most keen. The treatment recommended is on the lines already adopted by progressive educational authorities in this country. "Easy treatment" for mild cases consists in curtailing all reading work, etc., while for more serious cases oral teaching is prescribed. Myopia may seem a trivial subject to write about, but the fact that a growing percentage of the younger members of our population has to wear glasses makes it one of widespread interest. Correct treatment in the schools up and down the land may help to stem the tide.

ALAN MONCRIEFF
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The New Zealand Letter

(From our own correspondent)

In the original occupation of the South Island in the "forties" of the last century there were two settlements of denominational origin and particular importance. The Canterbury Settlement, of which the City of Christchurch is the centre, was under the auspices of the Church of England, and contained many representatives of county families; to this day Christchurch is by far the most "English" city in the Dominion. At the same time a settlement associated with the Presbyterian Church of Scotland colonized Otago, farther south, and called its centre Dunedin, a former name of Edinburgh, where also racial characteristics remain and are still more pronounced. It will not, therefore, appear remarkable that the first step in higher education in New Zealand was the foundation of the University of Otago at Dunedin in 1869. That university however conferred few degrees and now confers none, for the establishment was soon followed by that of the University of New Zealand in 1870, of which it became a constituent college, in common with those in the other three centres of Auckland, Wellington and Christchurch. Otago, by virtue of its priority, retains the title of University, the others being styled University Colleges.

The University of New Zealand is comparable to that of London, or more closely to that of Wales. It holds examinations, grants degrees, and generally prescribes and coördinates the activities of the colleges, by which all teaching is conducted. There is a Faculty of Arts and Science in each college, but the faculties of the professional schools, Engineering, Medicine and so forth, are entrusted to one or other of the colleges alone. Medicine and Dentistry are both taught at the University of Otago only.

The School of Medicine at Otago dates from 1876, when a Chair of Anatomy and Physiology was established and some facilities for clinical work provided at Dunedin Hospital. In 1877 the late John Halliday Scott was appointed to the Chair. He was a graduate of Edinburgh and had some influence with the authorities there. Through his representations Edinburgh recognized the New Zealand course in the first professional subjects and admitted Otago students to its wards and final examinations, who thus qualified with the Edinburgh degree. Other home universities followed the example of Edinburgh. Meantime the standard of clinical study and teaching at Dunedin was

raised and the University of New Zealand recognized the complete course in 1883. In 1888 the first student qualified at Otago, since when a rapidly increasing number of New Zealanders have taken their whole course there; more than half of those on the present register are Otago trained. With the elaboration of the course the staff has naturally been increased and there are now nine professors and some five and twenty lecturers and assistants employed in the School.

The modern subjects, pathology and bacteriology, could not be properly housed within the university precincts and a Medical School was opened for them in the neighbourhood of the hospital in 1916. Then years later an adjoining building was put up for anatomy and physiology, partly in order to fulfil the demands of the General Medical Council that these subjects shall be studied throughout the course in their clinical applications. All of these are very well found.

All clinical work was for a long time carried out at the Dunedin Public Hospital which is controlled by the local Hospital Board. This contains about 300 beds. Several London teaching hospitals have, or had until recently, no more, but in this country infirmaries and convalescent institutions are few, consequently patients spend a long time in the wards and the turnover of cases is small. Considerable economy, therefore, is required to give students adequate experience. This has recently been relieved to some extent as follows.

The British statutory five years' course is becoming inadequate the world over for instruction in the rapidly increasing number of subjects inflicted on the student, and most schools, including those in Australia, have either avowedly or in practice extended the course to about six years. No one in New Zealand would be content that anything like a back door into the profession by way of a shorter course should be provided here, so it was proposed in 1921 that the course should be extended to six years. There was considerable controversy about excessive laboratory work and so forth, until it was decided that clinical work should be studied for three years, the last of which students were to be free to spend at any of the other centres, provided that the hospital staff there undertook to give adequate clinical instruction, which all of the staffs with great public spirit did undertake, and have since most efficiently carried out.

In the course of the last ten or fifteen years various bequests and endowments have enabled the University to establish part-time professorships in Medicine and Surgery, the incumbents being allowed private practice under certain restrictions. They have not, however, been particularly well satisfied with the results. It is now proposed to institute a whole-time Chair of Obstetrics and Gynæcology. The present part-time professor holds his title in virtue of distinguished service to the School, but the Chair has hitherto been unendowed, and the incoming professor will owe a very great deal to a woman graduate of Otago, Dr. Doris Gordon. This lady has been much interested in Obstetrics and some years ago visited Europe to investigate the subject, with introductions from the Premier of New Zealand. On her return she was largely responsible for the establishment of the New Zealand Obstetrical Society, which came into being in 1927 with the object of raising the standard of obstetrical work and collecting statistics. When the retirement of the present professor was announced, no funds being available to endow the Chair, the Obstetrical Society, or Dr. Gordon in its name, undertook to raise the money to do so chiefly through an appeal to the women of New Zealand. The organization of the appeal was excellent and the response remarkable. The country was divided into districts, each of which was to raise a specified sum. Suffice it to say that over £30,000 was subscribed, which was £6,000 in excess of the amount asked for. This amount was raised in five months, just after subscriptions for Cancer Research had been collected, and at a period of severe financial stringency. With the Government subsidy the Obstetrical Society has been able to attach to the Chair of Obstetrics and Gynæcology a salary of £2,000 a year. Consulting practice is to be allowed, but the fees earned are to be paid into the Department. A committee has been appointed in England to select a candidate.

This obstetrical appeal happens to synchronize with an attempt to re-organize the facilities for teaching midwifery, unfortunately with less satisfactory results. The late Right Honourable R. J. Seddon, when Premier, realized that there were no maternity hospitals in the country, and in 1905 established the St. Helen's Hospitals as such, which were named after his place of origin in Lancashire. They were converted dwelling houses, each of about ten beds. There was one in each centre and three others have been established elsewhere. Some of them have since been rebuilt and modernized. They are under the Health Department, not the local hospital boards. The women paid the very modest fee of 30/- weekly, which has never been increased. Mr. Seddon intended the hospitals for the training of midwives, and gave some kind of undertaking that medical students should not be admitted to them. To meet this exclusion the late Dr. F. C. Batchelor, the founder of obstetrics, and a most potent force in the Medical School in his day, induced the Otago Hospital

Board in 1907 to take over for maternity purposes a Rescue Home belonging to the Salvation Army which is now known as the Batchelor Hospital, and this has been the main place of instruction for Otago students. With the increase of the latter's number, the improvement in standards, and the growing demands of the General Medical Council, this hospital has proved inadequate and the St. Helen's Hospital in Dunedin has long been used for the training of students, as indeed have those in the other centres. At the present moment a movement is on foot to combine the Dunedin, St. Helen's and the Batchelor Hospitals and build an adequate modern hospital for maternity cases and for proper instruction in midwifery by the new professor, but unfortunately various opposing interests are as yet unreconciled.

D. W. CARMALT JONES.

Dunedin, New Zealand.

Letters to the Editor

A Correction

Dr. Perry Goldsmith writes to correct an error that appeared in his article in the October issue of the *Journal* entitled "Inflammation of the Maxillary Antrum."

The sentence beginning at the third line, second column, page 517, should read as follows:—

"Regeneration of the antral mucosa takes place in most cases, as is shown by the work of McGregor and Knowleton, but even when this occurs, leaving a new normal lining, the same pathological process that took place in the original mucosa is not likely to recur."

The word "not" was omitted.

Topics of Current Interest

Proposed New Formulæ for the B.P.

A Pharmacy Subcommittee of the Pharmacopœia Commission was formed in September, 1929, and has now issued its first report,* which incorporates suggestions for some new formulæ. An important economy would be effected by the permission to use industrial methylated spirit in making solid extracts and certain other preparations, subject to the regulations of the Board of Customs and Excise. For example, among the new formulæ set out in the report the use of industrial methylated spirit is suggested in the preparation of extractum belladonnæ siccum, extractum cinchonæ, extractum colchici siccum, fel bovinum purificatum (in future to be known as extractum fellis bovini), linimentum and emplastrum belladonnæ, liquor picis carbonis, and certain resins. Another economy is proposed in the replacement of olive oil by cotton-seed oil in certain preparations, such as unguentum hydrargyri compositum, and in linimentum camphoræ, since a high-grade olive oil will be described in the Pharmacopœia. In parts of the Empire outside the British Isles the use of arachis oil or sesame oil will be permitted. The subcommittee recommend that for convenience in manufacture the quantities in the formulæ for glycerins should be expressed in weight. The error involved in measuring glycerin would thus be avoided. They also recommend the inclusion in the Pharmacopœia of concentrated preparations which, when diluted with seven times their volume of distilled water, will be equivalent in strength, if not in flavour, to fresh infusions. Practitioners who prefer fresh infusions would be able to ensure that these will be dispensed by adding the word "recens" to the name of the infusion. Digitalis should be dispensed only in fresh infusion. In response to the suggestion that lard and benzoated lard should be replaced as far as possible by a base not liable to develop rancidity, experiments have been made with mixtures of paraffin and various fats, with the result that a formula has been devised under the name of unguentum simplex. This consists of wool fat (1 part), hard paraffin (2 parts), and soft paraffin (17 parts), and could be used for certain of the official ointments which are now made with lard. Since an international agreement requires that the name "tincture" shall not be given to simple solutions of chemical substances, the two tinctures of iodine official in the B.P. 1914 should be renamed and classed as solutions, the present names being retained as synonyms. We can confirm the conclusion of the subcommittee that an official preparation corresponding to the "French tincture of iodine" is required; they propose that the need would be met by a 10 per cent w/v solution of iodine in alcohol (95 per cent), which might be named liquor iodi simplex. A preliminary survey of the report does not suggest that the criticisms which are invited in cordial terms will be drastic. We are

* Pharmacopœia Commission. Reports of Subcommittees. I. Report of Pharmacy Subcommittee, August, 1930. Published by authority of the General Medical Council. London: 44, Hallam-street, W. Pp. 35. 1s.

assured that careful consideration will be given to all opinions evoked by the report, and recommend physicians to study it with attention.—*The Lancet* **2**: 918, 1930.

The Health of Industrial Workers

Workers in industry are healthier than the general population, and it is the young employee rather than the elderly who is prone to disease, according to indications found in a study made by the Milbank Memorial Fund.

Dean K. Brundage, of the United States Health Service, in a study for the research division of the Fund, has analysed a large volume of data showing the extent of disabling sickness among wage-earning adults. His report states:—

"The sickness statistics of industry represent to a surprising extent the younger adult ages. In the manufacturing industries of the country as a whole, probably 80 per cent of the men are below age 45. A larger proportion of the female industrial workers, apparently from 90 to 95 per cent, is below age 45.

"There is evidence in the age curves of illness that industrial workers are not representative of the general population from a physical standpoint. Rather, they appear to be, in the main, the flower of the general population in physique and constitution. Between 15 and 50 the age curve of illness in a general population group was found to mount more rapidly than in a typical industrial group. In the general population the trend is steadily upward from the ages of 20 to 24 on; but among the industrial employees the frequency rates, based on disabilities lasting two working days or longer, rose more slowly from age 25 to 40, and then actually declined to about age 60, after which the upward trend was resumed.

"The failure of illness frequency to increase with age as rapidly among industrially employed persons as among those in the general population suggests that the healthier individuals may tend to remain in industry to a greater extent than the sickly, thus providing a more favourably selected group from a health standpoint in middle age and beyond than is found among those just beginning industrial life."

The study further disclosed that, during the eight years from 1921 to 1928 inclusive, respiratory diseases caused nearly one-half of all the sickness disabilities, with the digestive disorders second. Contagious and infectious diseases caused only about 3 per cent of the cases, which may indicate the efficacy of public health efforts in those directions.

Loss of time for more than one week does not increase markedly with age among industrial workers until about age 50, although the number of days lost does increase. Women workers tend to be absent on account of illness 50 to 100 per cent more often than the men, especially for short periods. Married women experienced considerably more disability than single women.

The excessive use of alcoholic stimulants, according to two studies made by the United States Public Health Service, was most pronounced among men doing the heaviest, most disagreeable work. Gold and coal miners, granite cutters and employees of a dusty cement plant showed a high rate of sickness, especially from respiratory diseases, while pneumonia was marked in certain departments of the iron and steel industry. All four of these trades showed a definite excess in number of influenza victims.

Drug Addiction in America

The public health service of the United States has estimated that there are about 110,000 drug addicts in that country, or approximately 1 in every 1,000 of the population, but it is, of course, impossible to know the actual number. Dr. W. L. Treadway, assistant surgeon-general to the service, thinks that any estimate above 200,000 is beyond reasonable probability, and that there is much tendency to exaggerate. At any rate, during the last three years 11,697 persons were committed from the continental United States to Federal prisons for violation of the Federal narcotic laws: 10 per cent of them were women. The offenders come from every grade of society, but it has been estimated that 80 per cent belong to the unemployed underworld, and that 20 per cent have served five or more terms in prison for other offences unconnected with their addiction. The proportion of yellow races is high—about 30 per cent—and these usually smoke opium. A large number of the women are prostitutes. Few of the cases are under 20 or over 40 years of age, and there is some reason to suppose that new young addicts are not being made as abundantly as in the past. The average age among 1,660 individuals was 38. Some of them were earning their living lawfully, but the majority tend to increase their doses, become unsteady, irregularly employed, and migrant. Most of the drug-taking is in large centres of population. More than half the accused persons had had a common school education; 15 per cent were nearly or quite illiterate; and another 15 per cent had had a high-school education. Only 0.06 per cent had had professional training. As a general rule, Dr. Treadway says, alcoholic drunkenness was not associated with drug addiction, and 936 out of 1,317 male addicts reported were total abstainers; only eight took alcohol in excess. The drug of choice was morphin or heroin,

more often given hypodermically or intravenously than by inhalation. The precipitating causes attributed are interesting: medical treatment, 285; self-treatment for pain, 212; influence of other addicts, 594; curiosity, thrill, bravado, 112.—*The Lancet* **2**: 914, 1930.

Another Gas Hazard

The American people are beginning to be protected so far as concerns the food they take into their stomachs. They have only inadequate protection of the air they take into their lungs. Under the federal Food and Drugs Act, a bureau of the United States government is charged with the duty of excluding from interstate commerce foodstuffs that are spoiled, adulterated, or preserved with toxic substances. The government gives little or no similar protection with regard to materials and articles in interstate trade that may be harmful or fatal when their fumes are inhaled.

The Committee on Toxic Gases, appointed by the American Medical Association a year ago, has already published reports on the hazards of carbon monoxide from city gas and automobile exhaust and on the hazards of the gases used in household refrigeration. The most significant feature, particularly of the latter report, is that the information which has now been gained at the cost of many human lives could and should have been obtained by laboratory experiments on animals. Even when such knowledge is available, it is not self-enforcing. Governmental supervision and enforcement of laws and ordinances are necessary, if the public is to be protected from its own ignorance of such technical matters. This need is emphasized by a new, or greatly increased, gas hazard to which, according to reports, the public is to be exposed during the coming winter.

Methanol, or methyl alcohol, was until recently produced by the destructive distillation of wood. It is now manufactured from water gas and hydrogen ($CO + H_2 + H_2 = CH_4O$) at a cost which makes possible a large production at a low price. One of the uses for which methanol is well adapted in all respects, except one, is in the antifreeze mixture in automobile radiators. This unfortunate exception to its good qualities consists in the fact that methanol is a volatile cumulative poison. When taken in frequently repeated small doses, methanol induces blindness; in larger doses, whether by the stomach or by the lungs, it may cause death.

As the coefficient of distribution of methanol between water, or blood, and air is high, by far the greater part of any quantity of methanol that reaches the lungs is absorbed. Unlike ethyl alcohol, methanol is not burned in the body to any considerable degree, and its excretion through the breath and the urine is extremely slow. The toxic dose is not large and is easily reached even when the amount absorbed daily is too small to induce a noticeable initial effect. Contrary to the claims that would minimize its dangers, methanol is quite as poisonous when inhaled into the lungs as when taken into the stomach. Erroneous also is the assertion that, as the synthetic product is almost pure methanol, it is less toxic than the somewhat impure product obtained by the older method of manufacture. The fact is that in any preparation of methanol, pure or impure, the chief toxic substance is the methanol itself.

If, as now seems probable, methanol is widely sold for use in automobiles during the coming winter, and if precautions and warning in regard to the dangers of inhaling its fumes from heated automobile radiators are not instituted, it is highly probable that many cases of blindness will result, and probably also fatalities.—Ed. *J. Am. M. Ass.*, Aug. 30, 1930.

Surgical Fees

In his presidential address to the sixtieth annual meeting of the Colorado State Medical Society, held at Pueblo, last month, Dr. W. A. Kickland, of Fort Collins, presented a forceful and independent point of view on the disparity between medical and surgical fees. The high cost of surgery, he remarked, is not new. A surgeon in the thirteenth century was able to charge the equivalent of $200 for an operation and to claim in addition an annuity of $25 a year. But in modern times the difference in the fee paid for the difficult and skilled work of diagnosis and for surgery, which may involve no more skill nor the use of more costly apparatus, has led to abuses. Fee-splitting, he thought, was originally an attempt to correct the injustice and for a while it worked well. The patient was not submitted to operation without consultation; surgery was confined to the trained specialist and medical relations were happy. However, abuses crept in. The operator might be selected less by his skill than by the share of his fee which he would offer. The medical man was tempted to urge operations for the sake of the profit which might come to him. When, therefore, the American College of Surgeons was founded in 1913, stringent regulations against fee-splitting were made, and in the State of Colorado fee-splitting is now punishable by a heavy fine, or a gaol sentence, or both. Dr. Kickland is not altogether satisfied with the consequences of this severe repression, which still leaves untouched the injustice of unequal fees. The general practitioner in Colorado has now resorted to the practice of surgery himself. In one city, Dr. Kickland said, where there were

only three men doing major surgery 12 years ago, there are now 28 surgeons of whom 19 engage in major surgery. The patient is liable to be deprived of the advantage of consultation and of the operative skill which comes with adequate surgical training and a practice limited to surgery, while the temptation to urge surgical interference with undue frequency has not been removed. At the same time the man who devotes years of his life to preparation for special practice is handicapped by unfair competition. Dr. Kickland's solution of a difficult problem is for the State to sanction special surgical practice only on production of a diploma granted after post-graduate study.—*The Lancet* **2**: 811, 1930.

The Plague of Questionnaires

Dr. Hamilton Holt, president of Rolins College, annoyed by the continuous influx of questionnaires that flow across his desk has devised a retaliatory method. With receipt the other day of a questionnaire from an educational worker in a Western institution asking for information in a "survey" of another "educational problem," Dr. Holt dictated a "stock form" reply to be sent in future to all authors of questionnaires.

The reply is as follows:

"The academic mind now seems to be passing through a questionnaire craze. Almost every mail brings us requests to fill out questionnaires on every conceivable subject. If we comply with these it will take a great deal of our valuable time. Therefore, before we reply to your questionnaire just received will you kindly fill out the following questionnaire yourself?

" '1. What are your qualifications for asking these questions?

" '2. What are your qualifications for analyzing the answers received?

" '3. What guaranty will you give that the information furnished will be put to any use?'

"The questionnaire craze is merely an aspect of the tendency to glorify research at the expense of teaching," said Dr. Holt. "I have seen so many examples of the 'evil' of research that I have become prejudiced on the subject.

"To-day we find hosts of men engaged in the laborious, time-consuming and unprofitable task of writing uninspired theses on unimportant subjects and trying to learn more and more about less and less."

Abstracts from Current Literature

MEDICINE

Clinical and Pathological Studies on So-Called Tubular Nephritis. (Nephrosis). Wolbach, S. B. and Blackfan, K. D., *Am. J. M. Sc.* **180**: 453, 1930.

Wolbach and Blackfan have seen 21 cases of tubular nephritis or nephrosis occurring in children during the past five years, ten of which were studied until the time of death. Necropsy was obtained on eight cases, which are reported in detail from both clinical and laboratory aspects. The cases presented a striking similarity. The onset was usually insidious, and the course of the disease characterized by marked anasarca, often periodic in intensity, a normal blood pressure, a normal blood non-protein nitrogen, and a urine which contained plenty of albumin and casts, but few if any red cells. The casts sometimes revealed lipoid bodies. The treatment ordinarily adopted in nephritis had little or no effect on the œdema. A high protein diet caused a temporary disappearance of the anasarca in some cases. Pathologically, the important lesions were in the kidneys, the liver, and the thyroid. The kidneys were pale and swollen. On section, the glomeruli were not found to be diseased, but the tubules were the site of a widespread degenerative process characterized by swelling of the epithelial cells, fatty degeneration, desquamation and infiltration by leucocytes. Active regeneration of the epithelium, as indicated by mitotic division of these cells, was a common finding. The foregoing features are well illustrated by the excellent microphotographs. In two of the eight cases the thyroid gland showed a definite degenerative process, characterized by absence of colloid, shrinkage of the epithelial cells, and injection of the capillaries. In many cases the liver cells were found to be atrophic, especially towards the centre of the lobules.

The authors feel that the great similarity in the eight cases suggests some common etiology or pathogenesis though there was nothing in the history or in the post-mortem findings of these cases to indicate its nature. The finding of degenerative changes in the liver and thyroid as well as in the tubules of the kidney suggests that the important underlying causes of the disease may be extrarenal. Consequently they believe that the term "nephrosis" or "tubular nephritis" is not an appropriate one.

E. S. MILLS

The Coronary Arteries in a Case of Familial Liability to Sudden Death. Herpath, C. E. K. and Perry, C. B., *Brit. M. J.* **1**: 685, 1930.

These authors report a very interesting family, in which the father had dropped dead at 42. There were nine children, the eldest a woman of 47 with two normal sons, a woman of 46 with a normal daughter, a girl who died in infancy, a son who had died suddenly at 43, another son who had died suddenly at the age of 30 while playing football, two sons living aged 39 and 38, another son who had died suddenly at 31, and a daughter who had died at 21 of some heart disease. There had been an autopsy upon the son who had died while playing ball, and numerous atheromatous patches had been found in the coronary arteries. In the son who died at 43, examination some weeks before death showed a heart not much enlarged, a blood pressure of 120/70, arteries not thickened. An electrocardiogram taken some months before death was fairly normal, but the one taken just a few weeks before the man died, showed the T_2 waves barely positive and the T_3 waves definitely negative. Autopsy showed marked atheromatous changes in the abdominal aorta, a heart somewhat enlarged, and much thickened coronary arteries. These were injected and the left heart showed that marked increase in vascularity, as compared with the right heart, that indicated an age more than twice the man's actual age. The myocardium showed areas of fibrosis and in both ventricles there were places in which the coronary circulation was definitely obstructed. This record is interesting and unique in that a father and three of his sons died suddenly, and in that two post-mortem examinations showed extensive atheromatous changes in the coronary arteries.

MADGE THURLOW MACKLIN

Familial Eosinophilia. Armand-Delille, P. F., *Guy's Hosp. Rep.* **80**: 248, 1930.

As is well known, the percentage of eosinophiles is increased in the circulating blood in some of the infectious diseases, in many diseases of the skin, in bronchial asthma, in many cases of malignant tumour, and after splenectomy. The most common cause of eosinophilia, however, appears to be the presence of parasites in the body. That an undue increase in the number of eosinophiles can be due to an inherited factor, with no other explainable cause, seems apparent from the family history reported here. The father showed 6 to 7 per cent eosinophiles; the mother 4, which is the upper limit of normal. The first child aged 11, had 14.8 per cent; the second varied between 51 and 62 per cent; the third had 27.6, the fourth 27, and the fifth 21 per cent, while the two youngest aged 4 and 2, had a normal percentage of 2 in each case. The other features of the blood picture in these cases of eosinophilia were decreased polymorphonuclear neutrophiles, and increased lymphocytes. The stools were repeatedly examined for ova of parasites, but the examinations gave negative results. X-rays did not reveal any signs of hydatid cysts in the liver or chest. The only explanation which the author advances is that there is a familial tendency toward eosinophilia. He cites three other cases from the literature which he considers undoubted examples of the same thing, other possibilities having been excluded as a cause. Gaugain reported a mother with 19 per cent, and her three children with 10, 14 and 15 per cent respectively. Bastai recorded a family in which the mother and her two daughters showed 33, 27 and 32 per cent eosinophiles. Cirio's cases were two brothers who had 65 and 6 per cent eosinophiles, while the three children of the former showed 65, 13 and 9 per cent of these cells in the blood. There seemed to be no assignable cause in any of these patients except an inherited tendency toward over-production of these cells.

MADGE THURLOW MACKLIN

Hereditary Ectodermal Dysplasia. Smith, J., *Arch. Dis. Child.* **4**: 215, 1929.

It will be recalled that this interesting anomaly of development consists in either total lack of or sparse development of certain structures derived from the ectoderm. The hair over the body may be wholly absent, or scarce; the sweat glands are lacking; and the teeth are few in number and abnormal. A sporadic instance of the disease, but very probably inherited, nevertheless, is given by Smith. The parents were normal, as were the three younger children. The first child, a boy of almost 6 years, had very little hair, never perspired, and possessed but ten teeth, six in the upper and four in the lower jaw. A piece of skin excised from the chest wall near the axillary line showed total lack of sweat and sebaceous glands, as well as of hair follicles. The lips in this child were thick and protruding, and the ears abnormally large. This syndrome usually occurs in more than one member of the family, but it is of interest that it may be inherited in several ways. Clouston's family, reported in the *Canadian Medical Association Journal* (**21**: 18, 1929), showed some of the features noted in this patient, but lacked others. His family showed lack of hair, dystrophy of the nails, and usually poor teeth, but the sweat glands were active. In his family the disease was never transmitted by an unaffected person. It is a peculiarity of the syndrome described by Smith, that in the majority of cases it is inherited, as is hæmophilia, exhibited by the male, but transmitted to him by his unaffected mother. It will be noted that Smith's case was a boy, hence the factors re-

sponsible for this condition, probably came to him through his mother.

MADGE THURLOW MACKLIN

The Present and Future Status of the General Practitioner in New Hampshire. Burnham, A. W., *New Eng. J. of Med.* **203**: 685, 1930.

Medical education has undergone radical changes but the general education of the laity who form our clientèle has also undergone a radical change. Fifty years ago the doctor was one of the few residents of a small community who had had a high-school education. In the last ten years New Hampshire has gained little in population, but there has been in increase of 33 per cent in high-school enrolment. Thus it is readily seen that the doctor often comes in contact with patients who are better trained in the fundamental sciences than he is himself. This situation alone is enough to veto any suggestion for creating a special sub-standard course for the training of country doctors.

Some changes might be made in the methods of teaching which would tend toward better preparation of young men for general practice. About fifteen years ago practically all the medical schools situated in distinctly rural sections of this country were forced out of existence by the cry of "More full time teachers, more and bigger hospitals, better facilities for clinical teaching, and more clinical material." In these small schools situated in the rural sections really existed the most favourable opportunity for the teaching of the homely art of medicine as well as the science of medicine.

The movement is now on foot to establish a New England Medical Centre in Boston. Possibly some sort of exchange might be worked out whereby the general practitioner could go to the medical centre for a period of study while the centre supplied him with a recent graduate as *locum tenens*. Perhaps some wise philanthropist might endow a chair for the teaching of the human element, the homely art of the practice of medicine. Is it presuming too much to suggest that such a chair should be occupied by a bona-fide country practitioner, ripened by years of experience and steeped in the intimate knowledge of the personal affairs of thousands of his fellowmen and women? The general practitioner can keep in step with the advance of modern medicine by hospital connections, contact and coöperation with the other members of the profession, post-graduate study, and by civic and social relations.

The highly trained young physician of to-day can neither be coaxed, cajoled, preached or threatened into locating in a community which does not offer him an opportunity to continue hospital practice. If the public wants the old fashioned family doctor who can bring the new baby into the world, circumcise him if necessary, remove his tonsils and adenoids, set his broken collar bone or leg without the advice of half a dozen specialists, then some means must be provided for supplying still more small hospitals open to the general practitioners in the rural areas.

In the discussion which followed this paper it was shown that 68 per cent of private practitioners in New Hampshire are 50 years of age or older; the average age is 55, and in towns of less than 2,000 population 85 per cent have passed the half-century mark.

LILLIAN A. CHASE

SURGERY

The Cause of Death in Uncomplicated High Intestinal Obstruction. White, J. C. and Fender, F. A., *Arch. Surg.* **20**: 897, 1930.

For many years the cause of death in all types of intestinal obstruction has been ascribed to toxæmia. A small number of investigators have claimed that toxæmia is not important in high intestinal occlusion. According to certain authorities intestinal obstruction may be divided into two groups. In the first, with occlusion of the lumen of the upper small intestine without interference with its blood supply, there is no toxæmia. In the second, the so-called "strangulation obstruction," where there is impairment of the circulation of the blood, there is marked toxæmia. The authors have demonstrated experimentally that an animal with a total obstruction of the upper small intestine can be kept alive and in good health so long as the loss of the digestive secretions is prevented and the nutrition maintained. They emphasize the absence of toxæmia in this type of obstruction. The presence of absorbable toxic substances in the dammed-up gastro-intestinal contents is inconceivable when it is through their injection that life was preserved. It is equally inconsistent to claim that hypothetic toxins in the body can be neutralized by the chloride radicle, when no extraneous salt was given and its content in both the blood and the tissues was considerably reduced during the experiment. In their experimental animals and in a large number of patients with this type of obstruction who have been studied in the Massachusetts General Hospital the same generalized dechlorination invariably occurred. There has been no corresponding rise of non-protein nitrogen or increase in the excretion of nitrogen by the kidney, which we would expect if a proteolytic toxin were being absorbed. The cause of death in the uncomplicated high intestinal obstructions is mainly the loss of salt and water, possibly also other substances, in the gastro-intestinal secre-

tions. When inorganic electrolytes are lost rapidly and are not replaced it becomes impossible for the organism to return its normal water content. This leads to fatal changes in the physiochemical equilibrium of the blood and tissues.

G. E. LEARMONTH

Diaphragmatic Adhesions. Head, J. R., *Arch. Surg.* **20**: 1016, 1930.

The author endeavours to point out in what manner adhesions between the diaphragm and the wall of the chest can act to further the healing of pulmonary tuberculosis, and how in their presence the production of diaphragmatic paralysis may be harmful rather than beneficial. Movement of a tuberculous lung discourages healing, while rest favours it. The experimental and clinical observations of Head have in great measure substantiated those of Hoover, who observed repeatedly in human beings and dogs that paralysis of the hemidiaphragm was followed by an increased upward movement of the lower ribs in the affected side and a widening of the subcostal angle. Stimulation of the nerve caused a narrowing of the lower part of the thorax, except where the dog had a very small subcostal angle and a high diaphragmatic arch, which was a rare occurrence. It was his opinion that under normal conditions the muscles tending to elevate the ribs, were able to overcome the antagonism of the diaphragm, but in his clinical observations, he found, in accord with Gerhardt, that pathological factors tending to lower the dome of the diaphragm or raise its attachment to the ribs so increased its medianward pull that the lower ribs were drawn medianward on inspiration. High adhesions between the diaphragm and the wall of the chest could bring about this paradox. The adhesions prevent descent of the diaphragm and the diaphragm prevents expansion of the bony thorax. The resulting immobility must be assumed as being favourable to the healing of tuberculous lesions. Head deduces from experimental evidence that there is a marked limitation of movement of the hemithorax in which the adhesions had been produced. Following section of the right phrenic nerve the movement of the ribs on this side was immediately and greatly increased. He concludes that the presence of such adhesions favours the healing of tuberculous lesions in the lungs and should be considered as a contra-indication to the operation of phrenico-exairesis.

G. E. LEARMONTH

Treatment of Empyema in Children. Browne, D., *The Lancet* **2**: 733, 1930.

A review of existing opinions of the subject is given with some ideas as to treatment. The factors considered in each case are as follows:—The actual mechanical condition of the abscess and the surrounding structures; the time-relation of the formation of the abscess to the original pneumonia, which is perhaps the most important single factor in prognosis, and he points out the immensely increased risks in the syn-pneumonic cases; the age of the patient, there being in children a greater liability to the syn-pneumonic form; the type of the infecting organism, streptococcal infections inclining to the syn-pneumonic form more than the pneumococcal ones and to that extent being more deadly; complications, such as pericarditis and metastatic abscesses; intercurrent diseases, such as measles and ear infections; the length of time that empyema has been present before the beginning of treatment.

Different types of abscesses and the effect of surgical measures are discussed. The author does not believe that an empyema is ever cured except by a complete growing together of the two layers of the pleura. He suggests that the pleural space may re-form to a certain extent but does not approach the completeness that is often found after a plastic peritonitis. In opening the normal chest he describes two phenomena which are, (1) a partial collapse of the lung. He does not believe that this is a dangerous factor. (2) The rush of air on inspiration into the pleural cavity through the wound instead of into the lungs through the trachea is far more important and dangerous.

Mr. Browne points out that in empyema the escape of purulent fluid will expand the lung rather than collapse it. The effect of the entrance of air during inspiration in empyema will depend on the size of the cavity and the rigidity of the wall, and in thick-walled abscesses there is no effect. When the inner wall of the abscess is a large and flexible area of pleura the effect on inspiration will be almost as great as if the normal chest had been opened.

The conclusions are that there is no danger from collapse of the lung on opening an empyema. Both the rapid release of pus and the free entrance of air should be avoided. The author describes the advantages and disadvantages of aspiration, rib resection and closed drainage. His own suggestion is that a small thoracotomy incision be made and two de Pezzer catheters inserted on their stylet, the expansion of the bulbous ends holding them in place. One catheter leads through a hole in a mattress to a drainage bottle and the other is used for insertion of Dakin's solution. He believes in blow-bottles and in getting his patients up as early as possible. He removes his catheter when the cavity contains less than 10 c.c. The average case is healed in three weeks.

W. L. GRAHAM

A Case of Hereditary Recurrent Dislocation of the Patella. Moore, B. H., *J. Bone & Joint Surg.* **12**: 654, 1930.

Moore reports the case of a young man of nineteen who had suffered for years from spontaneous dislocation of the patella. He was usually able to reduce the dislocation himself, but the importance of having a permanent cure effected was forcibly brought to his attention when he was forced to run to avoid being struck by a bus. The sudden motion caused the dislocation of the left patella and he was thrown to the ground directly in the path of the bus. Fortunately, he was not struck, but realized the necessity of prohibiting similar accidents in the future. The left knee, and then the right, were operated upon, time being allowed between the two operations to determine the result of the first. The only abnormality noted was that the internal head of the quadriceps was very poorly developed on both sides, which permitted the patella to be tilted at an unusual angle as well as to be pulled outward. In obtaining the family history the interesting fact was brought out that in four generations comprising 24 persons, there had been twelve, and possibly thirteen persons similarly affected. The patient had two unaffected sisters, but his father, and three of his father's brothers had suffered from recurrent dislocation of the patella. One of his uncle's sons also was affected. His father's parents were first cousins, the mother being affected but the father normal. Two of the father's brothers were affected. There was an indefinite history of the mother of these three boys (she being the great grandmother of the patient) being also affected. The affected grandmother of the patient had a sister who was normal, but who had two sons both with the trouble, and a grandson with it. Of the 13 affected, 11 were males, 2 were females. This need not necessarily bespeak an undue tendency on the part of males to exhibit this condition, for it will be noted that there were only 5 females to show it, and of these, 2 inherited the condition. There were 16 males on the other hand and 11 of these were affected. The fact that there were 68 per cent of the males and 40 per cent of the females affected may be due to mere chance with such a small number of females to choose from, or it may have some significance..

MADGE THURLOW MACKLIN

Diverticula of the Sigmoid. Mayo, S. J., *Ann. Surg.* **92**: 1930.

Diverticula of the colon may be true or acquired. The former, whether congenital, traction or pulsion, contain all the intestinal coats in the sac; in the latter the intestinal mucous membrane pouches through small openings in the musculature, such as holes for vessels, or at muscle defects. The latter type often contains small hardened fæcal masses. The sigmoid is nearly always involved in diverticulosis. If the entire colon is affected there is usually a gradual increase in the frequency of the diverticulæ from right to left. Diagnosis is evident on radiographic examination.

Of 31,838 examinations of the colon done at the Mayo Clinic 1,819, or 5.71 per cent, showed diverticulæ. Only 20 of these were less than 40 years of age. In 2,139 recorded cases of diverticulosis, active diverticulitis were present in 696; 64 per cent of the patients were men. Obesity is not an etiological factor, nor is constipation. Inflammation is usually limited to one of several diverticulæ. A considerable length of bowel may be obstructed by œdema and adhesive inflammation. Thus in acute cases a tumour is usually present in the left lower quadrant. Group one includes self-limiting diverticulitis and peri-diverticulitis, causing pain in the region of the mass, a moderate fever and gaseous distension. These patients are ambulatory in a few days and the mass disappears in a few weeks. Group two includes the cases with abscess formation and the development of a fistula and require surgical interference. Group three includes the cases showing obstructive symptoms. This may be due to hyperplasia, adhesions or angulation. In group four are the cases of carcinoma developing on a diverticulum. Carcinomatous change may be suspected when the tumefaction does not wholly subside, but remains as a chronic mass causing more or less marked symptoms. The relation between carcinoma and diverticulitis remains conjectural. The distinction can usually be demonstrated radiologically.

In acute cases treatment should be tentative. If an abscess forms it should be evacuated, to prevent the formation of a fistula. In acute obstruction colostomy should be done as close to the obstructed point as convenient. Subsequently the stenosing portion plus the colostomy should be excised simultaneously. Cæcostomy may be done instead of colostomy. The relief of internal fistulæ is a serious problem, but excision of the fistula with repair of the sigmoid has been performed with good results.

STUART D. GORDON

Fracture of the Patella. Jones, R. W., *Brit. M. J.* **2**: 592, 1930.

Prolonged immobilization in extension of an injured knee joint, particularly if it be arthritic, inevitably results in some degree of permanent limitation of flexion. Accordingly, early move-

ment is essential in fractures of the patella. To allow this, firm operative fixation is required. If successful in obtaining this, assisted movement may be commenced the following day. If the fracture is comminuted and fixation imperfect, movement is not commenced until the fourth week and is preceded by gentle flexion under anæsthesia deep enough to relax the quadriceps. Any manipulation between the fourth and twelfth weeks is unsafe, as any adhesions which have formed are more resistant than the strongest suture material and separation may result. Thus manipulation which is deferred longer than the four weeks should be postponed until there is clear evidence of bony union. Catgut, kangaroo tendon and silver wire are not sufficiently strong or safe; the author prefers thick braided silk. If two fragments are present a horizontal hole is drilled in each and two pieces of silk threaded through and tied at the sides. If this is not considered satisfactory two holes are drilled vertically and the silk passed and tied. Tilting of the fragments is prevented by accurate centering of the drill holes.

Rapid healing of the wound is the result of 48-hour skin preparation, screening of the wound at operation, no-touch technique and careful skin suturing. The inverted V incision should never be used, because of the danger of sloughing at the apex. The contraction of postural bone is the best aid in fully redeveloping the quadriceps. Fascia lata is inadmissable in these cases because it is so elastic that early movement results in springing of the fragments and perfect fitting is lost. Avulsion of the patellar ligament from the lower pole of the patella is best repaired by fascia lata. A piece is removed from the anterior margin of the fascia, left attached to the tibia at its lower end, passed through a drill hole in the lower end of the patella, and then pulled upon until the patella is at its normal level. The fascia is then stitched to itself through a tunnel in the tibia.

STUART D. GORDON

OBSTETRICS AND GYNÆCOLOGY

Further Observations on the Gastric Juice in Pregnancy. Arzt, F., *Am. J. Obst. & Gyn.* **20**: 382, 1930.

The results in 50 cases of pregnant women are presented. Practically all of these patients suffered from nausea and vomiting. A test meal consisting of shredded wheat biscuit and 300 c.c. of water was used. Free hydrochloric acid in all cases was decreased, and this decrease was more marked in the early months when nausea and vomiting are more frequent. Twenty-nine patients in the first three months had total absence of hydrochloric acid. The total acid was decreased in proportion to the free acid. In spite of the hypochlorhydria the total chlorides in the fasting contents were normal or even increased. It is suggested that the absence of free acid is due to its being neutralized by regurgitation of the alkaline duodenal contents into the stomach. Caffein citrate in these cases has marked ability to cause an increased secretion of hydrochloric acid.

ROSS MITCHELL

Contracted Pelves and Disproportion. McGoogan, L. S., *Am. J. Obst. & Gyn.* **20**: 386, 1930.

Four hundred and seventy-one cases of contracted pelves or disproportion between the pelvis and the child occurring in 9,074 deliveries at the Royal Victoria Maternity Hospital, Montreal, are reviewed and the method of delivery analyzed. Two hundred and twenty patients were delivered spontaneously and 251 required operative interference. There were in this series two maternal deaths, both due to streptococcic septicæmia, giving a maternal mortality rate of 0.42 per cent. The fetal mortality was 10.8 per cent, of which one-third were due to intracranial hæmorrhage. In version and extraction the fetal mortality was high, 28.5 per cent in the prophylactic operation and 66.6 per cent in the emergency operation. Surgical induction of premature labour gave results not inferior to other methods of delivery, the fetal mortality being lower, but the maternal mortality greater, owing to the risk of infection. In 104 cases of Cæsarean section no mother was lost and the fetal mortality was only 2.8 per cent. Craniotomy is stated to be the method of choice in those patients in whom the child has died *in utero* or in whom such a severe grade of infection is present that Cæsarean section is contraindicated.

ROSS MITCHELL

The Pelvic Joints During and After Parturition and Pregnancy. Brooke, R., *The Practitioner* **746**: 307, 1930.

Pregnancy has a great influence on the incidence of sacro-iliac disease and injuries. Specimens obtained from post-mortem subjects at various stages of pregnancy show quite clearly that at full term the range of movement is increased approximately two and a half times above the maximum degree present in the non-pregnant woman. This increase takes place gradually and at the fourth month is easily recognizable. During the seventh, eighth, and ninth months the mobility increases rather more rapidly. After parturition the joint returns to its normal state more rapidly; thus at the eighth week it is still lax, and not until the third or fourth month has stability been completely regained. Not only is the return of stability of

the pelvic joints inter-related in some way with the normal involution of the uterus, but, in addition, uterine subinvolution is associated with a persistence of the lax condition of the joints. Disparity between the size of the fetal head and the maternal pelvis is another cause of the disturbance of the normal anatomical and functional state of the pelvic joints. Albee states that many of the cases of traumatic arthritis of the sacro-iliac joints show a traumatic rupture of the anterior layer of the synovial membrane.

In some instances the onset of sacro-iliac disorder occurs suddenly in women after pregnancy, or during the puerperium, immediately following some form of trauma, such as a blow or fall. It is the condition of the pelvic joints rather than the state of the woman's general health which should determine the date of her rising after childbirth. Subjects suffering from delayed involution, or difficult delivery of a child, either of large size or with much moulding of the head, should be kept in the prone position for a longer period than the stipulated ten days or so, which in the hurry and bustle of modern life is all that is allowed to her.

ROSS MITCHELL

The Obstetrical Aspect of Intracranial Hæmorrhage. Irving, F. C., *New Eng. J. M.* **203**: 499, 1930.

No maternity clinic is without an occasional case of intracranial hæmorrhage, nor is it by any means unheard of in the private work of active obstetricians. The cardinal sign of intracranial hæmorrhage is a disturbance of respiration, but all asphyxiated babies are not victims of intracranial hæmorrhage. The failure to establish spontaneous respiration within a reasonable time is strongly suggestive of intracranial vascular damage. Later evidences of intracranial hæmorrhage are apathy, refusal to nurse, pallor, and a tense anterior fontanelle. Spasm or paralysis may or may not be present. Sometimes the baby has a high pitched, insistent cry.

From 1920 to 1929 there were 13,843 babies born at the Boston Lying-in Hospital. The clinical diagnosis of intracranial hæmorrhage was made 99 times, an incidence of once in 140 births. Throughout the years from 1909 to 1929 there were 182 autopsies in which the heads were examined. Of these 73, or 40 per cent, revealed intracranial hæmorrhage as the cause of death. The various types of delivery show the following percentages of intracranial bleeding; Cæsarean section 0.3, normal delivery 0.4, low forceps operation 0.5, midforceps 3.0, high forceps 2.6, breech extraction 2.6, version 1.7.

The rôle of intrauterine asphyxia as a cause or predetermining factor has never received the attention that it deserves. Intrauterine asphyxia usually depends upon interference with the fetal circulation, be it by coiling of or by pressure upon the cord, contraction and retraction of a hypertonic uterus upon the placental site, or prolonged pressure of the fetal head upon an unyielding pelvis, cervix or perineum. The clinical signs are marked and lasting variations of the fetal heart rate and the passage of meconium. The resulting condition in the baby's circulation is that of acute congestion, often accompanied by hæmorrhages in different regions of the body.

In a recent series of 46 autopsies on newborn babies at the Boston Lying-in Hospital it was found that 18 had died of intracranial hæmorrhage. Of these 8, or 44 per cent, had hæmorrhages elsewhere in the body. Of the 25 cases that showed no evidence of intracranial hæmorrhage 7, or 25 per cent, showed hæmorrhages in other organs. The tendency to bleed is greatly increased by intrauterine asphyxia.

High forceps operations are going out of fashion. In the Boston Lying-in Hospital there were only 6 in 1928 and 8 in 1929 in some 4,000 deliveries. Mid-forceps operations are decidedly dangerous; low-forceps operations show a gratifyingly low incidence of fatalities from intracranial hæmorrhage. The rule is to apply low-forceps if the head has been on the perineum for two hours; the operation is preceded by a liberal episiotomy.

LILLIAN A. CHASE

PÆDIATRICS

Symptomatology and Immediate Treatment of Cranial and Intracranial Injury in the New Born Including Intracranial Hæmorrhage. Munro, D., *New Eng. J. M.* **203**: 502, 1930.

The commonest symptoms of this condition are hypertonicity, an abnormal or poor cry, cyanosis, and failure to nurse. Unlike hypertonicity cyanosis is more frequent in fatal cases. Tenseness of the fontanelle is a very important symptom, when present. Flaccidity, pallor and birth asphyxia denote a grave prognosis. The most reliable of all symptoms is the increase in intracranial pressure, which can be demonstrated in each case in the absence of surgical shock or dehydration.

The symptoms may be summed up as follows: a first baby which is hypertonic, cyanosed, and apathetic, refuses to nurse from the breast or bottle, and has a tense anterior fontanelle, an abnormal cry, and some respiratory abnormality may be presumed to be suffering from an intracranial injury. If, also, measurement of the cerebrospinal fluid pressure shows an increased intracranial tension the diagnosis become positive. A first baby which is pale and flaccid, refuses to nurse, and has a respiratory abnormality

immediately after delivery, is suffering from surgical shock.

No active measures are carried out on the patient in surgical shock. During this period absolute rest and quiet, with external heat, and a small amount of fluid by mouth through a medicine dropper are sufficient. In the more severe cases a drachm of saturated solution of magnesium sulphate has been given by the rectum, to be retained. When the patient has recovered from shock it is necessary to determine if the baby is suffering from hæmorrhagic disease of the new-born. If so further treatment of the intracranial condition must be postponed until the bleeding and clotting times have become normal. This is best accomplished by the administration of a sufficient quantity of normal blood given into the muscles. If the baby is so anæmic that transfusion is demanded it is better to use some other vein than the cranial one .

Increased intracranial pressure should be treated by repeated lumbar puncture and sufficient fluid removed at each puncture to reduce the pressure to normal. It is rarely necessary to do this oftener than once in 24 hours. The baby should not be removed from the crib for any purpose whatever and should be handled as little as possible. Food and fluid should be given by a Breck feeder or nasal tube until the patient can take the bottle without danger of tiring. This regime should be continued for two weeks after the spinal fluid pressure has become normal. Oxygen may be given for cyanosis. Convulsions are best controlled by lumbar puncture. Morphine is contraindicated. The author presents tables showing symptoms observed in 117 cases of cranial and intracranial injury.

LILLIAN A. CHASE

Comparing the Breast-Fed and the Bottle-Fed Infant. Glazier, M. M., *New Eng. J. M.* **203**: 626, 1930.

This investigation is based upon a detailed study of 217 infants, who attended two well-baby clinics in Boston and upon the study of vital statistics of 1,566 infants who were followed for one year. Home supervision was possible through a group of well trained graduate nurses. The two clinics were in districts of different economic, social and hygienic conditions. One was in the poorest district of the city; the other was in a good district. The infants were grouped as Group A: Breast-fed for 3 months or more. Group B: Breast and bottle fed for 3 months or more. Group C: Bottle-fed.

A comparison was made between the two districts as to: (1) nutrition; (2) development, infection, deficiency disease; (3) vital statistics.

Infants in the district with better hygienic and economic conditions (irrespective of breast- or bottle-feeding), gained more weight, were better developed, had less evidence of rachitis, less frequency of infection, and a lower mortality. In these two districts bottle-fed infants averaged a lesser gain in weight during the first six months, but averaged a greater gain in weight the second six months. For the entire year there was a greater total gain for the bottle-fed infant. There was clinical evidence of rachitis in one of every two infants examined in the poorer districts of the city, and only in one of every three examined in the better district of the city.

Rachitis, presence of enlarged adenoids and tonsils, frequency of infection, and delayed development are related and commonly associated. Frequency of infection and mortalities were most common among the bottle-fed group in the poorer district clinic, least common among the bottle-fed group in the better district. Poor economic and hygienic conditions, rather than breast or bottle feeding, are more responsible for the frequency of infection and instance of mortality in the infant. Not one clinic infant died of a gastro-intestinal infection. Two non-clinic infants (one breast-fed) died of gastro-intestinal infections. Non-clinic infants in each district had a larger mortality than the clinic infants in the respective districts. This study would suggest that infant mortality and frequency of infection have a definite relationship to poor economic and hygienic conditions. In districts where economic and hygienic conditions are fairly good, the average bottle-fed infant does as well as the average breast-fed infant.

LILLIAN A. CHASE

The Response to Plantar Stimulation in Infancy. Wolff, L. V., *Am. J. Dis. Child.* **39**: 6, 1930.

It is well known that the Babinski phenomenon does not represent a pathological symptom in infancy. There is, however, no agreement as to the age at which it gains pathological significance, or as to the age at which the mature form of the plantar response becomes established. A study of the literature shows the confusion to be due to the lack of any uniformity of technique and method of interpretation.

A carefully standardized technique was employed in the study of the total response to plantar stimulation in 60 healthy infants tested at monthly intervals over a period of seven months. The following conclusions are drawn: The classic Babinski phenomenon occurs but rarely during the first six months of life; the most frequent response during the early months is dorsal extension of all toes with or without fanning; at the seventh month a high percentage show consistently the characteristic

flexion of all toes to plantar stimulation; asymmetric response in the two feet is not an expression of anatomical asymmetry.

A. K. GEDDES

Association of Keratomalacia with other Deficiency Diseases. Weech, A. A., *Am. J. Dis. Child.* **39**: 6, 1930.

The prevalence of deficiency diseases in northern China, and the frequency with which evidence of multiple deficiency disease is presented by the same patient gave the author excellent material for this unique study on the coexistence of other deficiency diseases with keratomalacia. In China the average diet contains a suboptimal amount of protein and fat, practically all of which is of vegetable origin. It is likewise low in calcium and phosphorus. A diet so limited as to be deficient in one essential is liable to be defective in several. Since vitamins A and D are both fat-soluble and usually occur together in nature, patients suffering from a deprivation of vitamin A might be expected to show an associated lack of vitamin D.

Accordingly, 13 children with keratomalacia, all of them less than three and a half years of age, were investigated for evidence of rickets. Calcium and phosphorus blood studies in 10 of these cases were interpreted as showing coincident rickets in 2 patients, healing rickets in 3, and no rickets in 5. (In one patient with a normal roentgenogram the calcium and phosphorus of the blood were at a low level, probably because of the lowered serum protein due to a coexistent nutritional œdema.) Why did not all these children have rickets? What compensated for the deficiency of fat-soluble vitamin in their diet? They were not protected against rickets by optimal calcium and phosphorus intake, for the Chinese diet is deficient in these elements. Protein deficiency, both qualitative and quantitative, may have hastened the onset of keratomalacia but would hardly have caused the deficiency disease of the eyes so far in advance of any signs of vitamin D deficiency. An adequate explanation was found in the influence of sunlight (which is known to synthesize vitamin D in the body, but not vitamin A) to which most Chinese children are abundantly exposed. In the three instances of healing rickets in this keratomalacia series, the disease of the eyes had developed during the summer. In three of the cases without rickets, the keratomalacia occurred during the winter or spring, but the children were old enough to have had the advantage of a previous summer's sunlight. In the two patients with simultaneous keratomalacia and rickets the diseases had developed at such an age and such a season that previous exposure to sunlight was most improbable.

Scurvy, which is excessively rare in children of north China, was not encountered in this series. Œdema coexisted in five of the 13 keratomalacia patients. It was usually associated with diarrhœa and in the author's opinion was not an expression of specific avitaminosis. Anæmia was not prominent, but marked undernutrition was a feature in all.

A. K. GEDDES

Hypoplasia of the Mandible (Micrognathy) as Cause of Cyanotic Attacks in the Newly Born Infant. Eley, R. C. and Farber, S., *Am. J. Dis. Child.* **39**: 6, 1930.

Hypoplasia of the mandible as a cause of cyanotic attacks in the new born has received little attention in the literature. Eley and Farber report four cases seen at the Boston Children's Hospital over a period of two years. The patients ranged in age from three days to six weeks. All were born at full term, two spontaneously, one with low forceps, and one case was a difficult forceps delivery. The following features were common to all the cases: recurrent cyanotic attacks dating from shortly after birth, exaggeration of these attacks by nursing and by placing the infant on its back, failure to gain, inspiratory embarrassment, a short mandible, a cleft palate, the tongue displaced posteriorly and obstructing the pharynx.

The cyanotic attacks could be readily relieved by placing the infant on its face and elevating the foot of the bassinet. In more severe cases posture alone was not entirely efficient. A light brace so constructed as to displace the mandible forward and to exert continuous pressure against the mandible and the floor of the mouth was effective. Three patients were discharged with good gains in weight and free from cyanotic attacks. In one patient, seen two years later, the mandible had attained normal size and the child was in excellent condition. One case came to autopsy. A detailed anatomical study showed the lower jaw retracted eight millimetres behind the upper jaw; the mandible could be moved forward one centimetre; the abnormally thick short broad tongue lay vertically in the pharyngeal space.

A. K. GEDDES

UROLOGY

Present Status of Kidney Functional Tests. Thomas, B. A., *J. Urol.* **24**: 2, 1930.

For the practical routine work of the urologist these tests may be divided into: (a) the blood biochemical tests of nitrogen retention; and (b) the kidney tests of elimination of endogenous (urea and chlorides) and exogenous (indigocarmin and phenolsulphonephthalein) products.

The biochemical tests, whose value and utility depend upon the determination of nitrogen retention in the blood in the event of renal disease are; total non-protein nitrogen, urea nitrogen, urea salivary index, creatinine, uric acid, and plasma CO_2 combining power. The first mentioned is by far the most generally useful, but because it is a rather laborious determination it has been displaced by the second as a routine procedure; the urea nitrogen determination being a simple and dependable test. The remaining estimations, with the exception of creatinine, are rarely of much value. In considering the functional tests of elimination the most scientific and reliable should be a quantitative stress study, employing one of the endogenous products of metabolism, as urea. In this respect the urea concentration factor has been found to be exceedingly sensitive, but unfortunately it requires a good deal of time and trouble and has not therefore the popularity of the dye tests, exogenous products whose quantitative elimination is easily determined and gives an equally reliable index. Of these indigocarmin and phenolsulphonphthalein are most generally useful.

Indigocarmin is, in the writer's opinion, the most practical kidney test for absolutely all conditions with which the urologist is confronted. It is of particular value in renal tuberculosis, not only as a functional test, but also in the localization of the ureteral orifices, and it is in this connection that it frequently renders a signally meritorious service. Using indigocarmin, the author has worked out an efficiency test which he calls the index of elimination, and upon this he has learned to place great reliance. The index of elimination may be defined simply as the ratio of the output of the first and third periods of the normal cycle of elimination of a dye or other excretory product. Normally, the kidneys will eliminate about five times the amount of a dye in the first as in the third twenty-minute period following intravenous injection. When function is impaired the onset of elimination becomes delayed and there will be a relatively larger output in the third than in the first period. So long as the quantity of output in the first period exceeds that in the third the index remains in the positive phase, that is, one or more, and surgical intervention may be safely practised. When the output during the first period is less than that for the third, the index falls below one or into the negative phase, and major operative procedures are contraindicated. So great is the writer's reliance upon this index that if it is found to lie in the positive phase, any other test of kidney function is regarded as superfluous.

Phenosulphonephthalein, as a combined test of kidney function, is universally employed and its popularity transcends any other test ever offered to the profession. It may be used merely as a quantitative determination, but its value may be greatly enhanced by estimating the curve of elimination, or the index of elimination as for indigocarmin.

In cases of obstruction no test of elimination can be relied upon exclusively and it is here that blood chemistry admirably fills the gap.

N. E. BERRY

On Excretion Urography. Cooke, R. V., *The Lancet* **2**: 686, 1930.

The author reports favourably on the results obtained with uroselectan. The shadows cast are much less dense than with pyelography. There is the added advantage that the kidney substance is shown and one can get an accurate idea of the amount of good kidney tissue remaining, and an accurate estimate of the functional activity of the kidneys by following the alterations in specific gravity of the urine. Ureterograms are not obtained unless there is an obstruction of the ureter. He points out that the functional activity of a kidney might be temporarily inhibited, and the non-visualisation at a particular examination does not necessarily mean a permanently damaged kidney. He believes the method to be of particular value in children, in cases of profuse hæmaturia, urethral stricture, and enlarged prostate.

W. L. GRAHAM

OPHTHALMOLOGY

Lipæmia Retinalis. Parker, W. R., and Culler, A. M., *Am. J. Ophth.* **13**: 573, 1930.

This article consists in a review of 36 cases in the literature, with observations made in the study of two cases of their own. In case 1, on November 5, 1928, was found a marked lipæmia of the retina. The fundus picture is described as follows: right eye; media, clear, the disc oval vertically; physiological depression present; lamina cribrosa not seen; the disc grayish in colour; the vessels engorged (not ribbon-like), much broader than normal, the diameter being increased by about one-half; arterial reflex stripe increased. In the neighbourhood of the disc, the axis of the arteries is of a salmon-pink colour, paling to a cream near the walls; the veins, of a lavender tint. This rapidly fades, and one disc diameter from the disc the arteries and veins are indistinguishable, both becoming ivory white; the retina is transparent. The choroidal circulation shows quite plainly. Choroidal vessels have a faint grayish haze, not marked. The macula is well made out; foveal reflex is present. Left eye; fundus is essentially the same as in the right eye.

The summary of Case I is as follows. A young farmer with mild diabetes, which had been controlled with a high fat diet ten months before, returned to the clinic in acidosis on account of dietary indiscretions. His fundi revealed a lipæmia retinalis. The total blood fat was 11.6 per cent. His fundi became normal in 16 days on a high fat diet with insulin. His blood showed 2.26 per cent fat at this time, but fell gradually to 0.835 per cent.

The next step in the study of these cases is an attempt to establish the importance of acidosis as the essential factor in the causation of lipæmia retinalis, as the cases heretofore reported show an almost constant relation to glycosuria and acidosis.

The patient was placed on a high fat, high calory diet (containing 4,000 calories per day) for twenty-six days without demonstrable change in the fundus, thus controverting the theory, variously supported, that lipæmia retinalis is produced by fat in the diet. For 27 days he was allowed to show a gradually increasing glycosuria, without acidosis. The blood fats did not rise during this experiment. His fundi remained normal. He was finally allowed to develop an increasing acidosis, on the fifth day of which he showed a lipæmia retinalis when the blood fat was 3.65 per cent. This disappeared rapidly when his insulin was reinstated.

The second case was of a high school student, who had been under treatment for diabetes for two years, when he stopped his diet. Two weeks later he returned to the hospital with marked glycosuria and acidosis. His fundi showed lipæmia retinalis. He was placed on a high fat, high calory diet with insulin. His fundi returned to normal in nine days, coincident with a fall in total blood lipids to 2.83 per cent and a disappearance of the acetonuria. One week later, after his glycosuria was controlled, his insulin was decreased the glycosuria reappeared, but his blood lipids decreased slightly.

The following conclusions are drawn:

(1) Apparently, no disease except diabetes uncomplicated by treatment produces a lipæmia of sufficient degree to be recognized ophthalmoscopically. (2) Diabetics probably do not show lipæmia retinalis unless they are in acidosis. (3) Lipæmia retinalis is confined largely to younger diabetics because they have a less efficient fat metabolism than older people. (4) Roughly, lipæmia retinalis occurs when blood fats rise above 3.5 per cent, and disappears when blood fats fall below 2.5 per cent. (5) Lipæmia retinalis does not alter the prognosis for the diabetic in whom it occurs.

S. HANFORD MCKEE

NEUROLOGY AND PSYCHIATRY

Root Pain in Osteoarthritis of the Spine. Gunther, L., *J. Lab. & Clin. M.* **15**: 1257, 1930.

Osteoarthritis of the spine may cause pain or sensory disturbance either from accompanying meningeal reaction or from pressure in narrowed canals. The author points this out as a confusing factor in diagnosis. In giving their history, the patients frequently describe the root areas of their chief symptoms with surprising accuracy. The pain is generally rapid in onset and lasts a variable time. It is generally described as a nagging ache or parasthesia, brought on or aggravated by various movements, and often relieved by a change of position. The occurrence in chest or abdominal areas at times arouses fears of cardiac or visceral disease. A certain amount of shifting of the site of predominating symptoms occurs—the precordium, the small of the back, the abdomen, the occiput, being areas often mentioned. This variability and the chronicity of the affection often result in the patient being labelled "neurotic."

On physical examination, evidences of osteoarthritis are found in the peripheral joints and spine—the commonest findings being Heberdin's nodes, creaking in the joints, and restriction of movement. The x-ray findings are those usually described.

Temporary relief is obtained through the use of various analgesics and salicylates, but the main reliance must be placed on baking, massage and immobilization of the spine.

A. T. MATHERS

Lesions of the Frontal Lobe. Sachs, *Arch. Neurol. & Psych.* p. 735, Oct. 1930.

The author, a neurological surgeon of wide experience, bases his remarks on a review of 45 cases of lesions of the frontal lobe. The diagnosis of lesions in this region is notoriously difficult, and an attempt is here made to assess the relative value of symptoms and signs. The points of greatest value he believes to be : (1) facial weakness of central type affecting emotional movements on the side opposite the lesion; and (2) a mental change in which loss of memory for recent events and total indifference to the disease or its outcome are the most outstanding features. Other points of great interest and of more importance than once thought are: (1) frequent occurrence of convulsions; (2) the observation of nystagmus. Facial paresis is common because the facial centre in the motor area lies farthest forward and hence is first involved. That it should be most evident on emotional expression may be due to involvement of a special tract of fibres connecting the face centre and thalamus. All manner of mental symptoms appear and are

difficult of explanation but the memory defect, indifference, and, at times, euphoria are the most constant.

No explanation of the frequency of convulsions is offered. In discussing the occurrence of nystagmoid movements of the eyes, the author reiterates the difficulty of distinguishing frontal from cerebellar lesions at times.

The syndrome described by Foster Kennedy, viz., optic atrophy on the side of the lesion and choked disc on the opposite side, occurred but once in the series, and the author states the opinion that it can only be considered a trustworthy sign when the lesion involves the inferior surface of the lobe. No mention of the forced grasping or groping reflex, recently described by Critchley and Adie, is made. A good numerical summary of symptoms and signs is appended.

A. T. MATHERS

HYGIENE AND PUBLIC HEALTH

Recent Advances in the Laboratory Diagnosis and Specific Treatment of Pneumonia. Brown, M. H., *Can. Pub. Health J.* **12**: 444, 1930.

The classification of pneumococci into types I, II and III and group IV has been generally accepted. A large number of types are included in group IV, but as yet our interest centres mainly in types I and II, for which we have sera of demonstrated value. By the "stained slide" method devised by Sabin it is possible to differentiate types I, II and III and group IV within a few hours. The type responsible for an attack of pneumonia should be determined before administering serum. Type I and type II sera are now being made in concentrated form. Type III serum may possess relatively high potency in terms of a virulent stock strain and yet show no potency against a freshly isolated virulent strain of the organism.

Before giving serum it should be ascertained whether or no the patient is sensitive to horse serum. If a drop of 1:10 normal horse serum is instilled into the conjunctival sac, injection of the conjunctival vessels, itchiness and lacrimation develop in from five to fifteen minutes in sensitive persons. A drop of 1:1,000 epinephrine solution controls this reaction. Or the intradermal test may be used—0.1 c.c. of a 1:10 dilution of normal horse serum being injected into the skin of the forearm. A positive reaction is indicated by a raised wheal with pseudopodia, redness, and possibly itching, within from five to twenty minutes. Serum should not be given if the ophthalmic test is positive, nor to a person with known allergy, as evidenced by asthma or hay fever, nor to a moribund patient. A positive intradermal test indicates that serum should be given very cautiously.

The first injection, of 5 c.c., should be given very slowly—at least five minutes being taken. The patient should be watched closely for changes in pulse rate, respiratory rate and colour, and for any evidence of respiratory distress. If reaction occurs, it is usually with the first dose. Epinephrine, ten minims, subcutaneously, is a valuable agent in controlling reactions. One should wait two hours before giving the second dose—of 10 c.c., and after another two hours an additional dose of 20 c.c. is to be given. This dose is repeated every two hours until the desired quantity, usually from 100 c.c. to 120 c.c., has been administered. The serum is given intravenously.

In a large experience, Cecil and Sutliff report that the mortality of type I pneumonia has been reduced one-third and that of type II one-quarter by the use of serum. Every alternate patient in their group was a control. Mills, of Montreal, in a series of fifty-two cases, found that concentrated serum reduced mortality considerably.

W. H. HATTIE

B. Dysenteriæ Sonne Infections. Johnston, M. M. and Brown, A., *Canad. Pub. Health J.* **21**: 8; 395, 1930.

Since Sonne described, in 1914, the species of dysentery bacillus that now bears his name it has been reported in studies on dysentery made in several countries. Last year it was found in the United States by Gilbert and Coleman. Johnston and Brown now report its isolation at the Hospital for Sick Children, Toronto. They relate the particulars of a study extending from October, 1928 to April, 1930, which leads them to believe that 20 strains of Gram-negative late-lactose-fermenting bacilli isolated at Toronto belong to the Sonne class. Comparisons were made with strains obtained from various outside sources. Of the Toronto strains, 18 were obtained in the investigation of 175 cases admitted to hospital with a diagnosis of either intestinal intoxication or infectious diarrhœa, and two were from pyelitis cases. No strains were found in the examination of the fæces or autopsy material from 108 control cases.

W. H. HATTIE

Occurrence of Pulmonary Fibrosis and other Pulmonary Affections in Asbestos Workers. Merewether, E. R. A., *J. Indust. Hyg.* **12**: 198, May 1930; and **12**: 239, June 1930.

A great deal of discussion has arisen in industrial medical circles concerning asbestosis, which was unknown until 1924. The reporting of the first case stimulated the reporting of

others, but even to-day there are not more than a dozen clinical cases on record.

Merewether gives an account of an extensive and thorough study of conditions in the English asbestos industry. No asbestos is mined in England, so this study refers only to workers engaged in manufacturing.

Three hundred and seventy-four workers were subjected to a clinical examination. Eleven of these suffered from a fibrosis, which, presumably, came from exposure to dust in other trades, and they were, therefore, excluded from the group. Of the 363 remaining 274 were engaged in the industry for more than five years. On this side of the water it is generally believed that a clinical examination is of little value in a study of this sort if unsupported by x-ray examination of the chest. Merewether is of the opinion that a diagnosis of pulmonary fibrosis can be quite confidently made on clinical examinations, except in very early cases. Emphasis is laid on a thin, high-pitched percussion note and a sense of resistance to the percussing finger; deficient expansion is common and actual retraction of the apices during inspiration. Indefinite auscultatory signs are recorded, such as weakening of the respiratory murmur, more especially at the bases. Unfortunately there is no standard percussion note and no standard breath sound, so that alterations in these signs, unless unilateral, are not unequivocal. On the basis of the clinical examinations 95, or 26.2 per cent, of the cases were classed as fibrotic, and 21, or 5.8 per cent, as pre-fibrotic. Radiological examinations were made of 133 cases, of which 39.1 per cent showed fibrosis and 16.5 per cent suggestive changes but not definitely diffuse fibrosis.

In addition to the clinical and radiological examinations of the workers investigation of the dust count in the air of the workrooms was made. The instrument used was the Owens jet apparatus. This instrument may yield higher counts than the Greenberg "Impinger", which is the instrument commonly used on this continent in work of this sort. The United States Public Health Service has tentatively set 10 million particles per cubic foot (370 per cubic centimetre) as the limit of safety in the case of granite dust. Merewether's figures range from 506 to 6,324 particles per cubic centimetre. However, it is not strictly fair to compare the results obtained with two different types of apparatus.

It is the opinion of the author that continued exposure to high concentrations of asbestos dust may result in fully developed fibrosis in 7 to 9 years, and possibly death in 13 years. The question as to whether asbestosis causes an increased susceptibility to tuberculosis remains uncertain.

FRANK G. PEDLEY

The Effect of Chemically Pure Carbon Monoxide, Illuminating Gas, and Automobile Exhaust Gas upon the Fragility of the Red Blood Cells. Mayers, M. R., Rivkin, H. and Krasnow, F., *J. Indust. Hyg.* **12**: 300, 1930.

Previous studies by various investigators have shown that carbon monoxide in combination with other toxic gases, such as hydrocyanic acid and hydrogen sulphide, is more toxic than in the pure state. That is to say a mixture of two such gases may kill, whereas separately in the same concentrations they may be relatively innocuous. The experiments of Henderson and Haggard are quoted, in which it was shown that animals exposed to illuminating gas or automobile exhaust gas would die when the blood became respectively 70 and 60 per cent saturated with carbon monoxide, while a blood saturation of 80 per cent from exposure to chemically pure carbon monoxide would be survived by the same kind of animals. These experiments indicated, therefore, that carbon monoxide is not the only toxic element in illuminating gas or the exhaust gas of automobiles.

In the experiments conducted by the authors red blood cells were exposed to air, pure carbon monoxide, illuminating gas, and the exhaust gas of automobiles, in an attempt to determine whether these gases differed in their effects on the fragility of the red cells. The accompaning table summarizes the results obtained.

	Complete hæmolysis percentage HCl	*Partial hæmolysis percentage HCl*
Untreated blood ..	0.25–0.33	0.34–0.43
Aerated blood	0.25–0.32	0.33–0.45
Pure CO. blood ..	0.25–0.33	0.34–0.45
Illuminating gas blood	0.25–0.35	0.37–0.48
Exhaust gas blood .	0.25–0.36	0.37–0.47

FRANK G. PEDLEY

Communicable Diseases and the General Hospital. Jackson, F. W., *Canad. Pub. Health J.* **21**: 9, 423, 1930.

In this paper Jackson emphasizes the value of hospital treatment of the communicable diseases. Taking the Manitoba experience with diphtheria in 1929 as an example, he tells us that the case mortality of Winnipeg cases was 3.8, while that of the rest of the province was 9.8. This he considers to be significant, as 80 per cent of the Winnipeg cases were hospitalized as against 20 per cent of the cases in the rest of the province. It would be economically impracticable to erect isolation hospitals throughout the province, but suitable isolation sections could be established in connection with existing general hospitals, and in this way duplication of staff, equipment, etc., would be avoided. The possibility of spread of a communicable disease within general hospitals is considered. This occasionally occurs even now, and the instance is

cited of a general hospital in England in which 33 cases of scarlet fever were definitely traced to a ward-maid. Jackson would have it required that all who are employed in hospitals as nurses, ward-maids, kitchen help, or orderlies be Schick- and Dick-negative. Of the value of active immunization against diphtheria he is fully persuaded. He feels, too, that active immunization against scarlet fever is of real service. He advocates that in the case of Dick-positive persons engaged in hospitals active immunization should be undertaken at once, giving a series of five doses of the toxin. After the lapse of ten days the Dick test should be repeated, and, if still positive, another dose (10,000 skin test doses) should be given. "Again repeat the Dick test, and if required give another dose of the same size. If ten doses in all are required it should not be considered too much trouble to obtain an immunity to scarlet fever."

W. H. HATTIE

The Nature of Dietary Deficiences of Milk. Becker, J. E. and McCollum, E. V., *Am. J. Hyg.* **12**: 2, 503, 1930.

In this paper the authors present conclusions reached after a study of the nature of the dietary deficiencies of milk which they carried on over a period of several years. The data presented show that when rats are confined to rations consisting chiefly of milk and dextrinized starch progress is not normal. Growth curves have a tendency to flatten after about three months and normal reproduction is seldom observed. Of 38 diets in which milk powder (60 to 85 per cent of the total quantity) was combined with a variety of other substances, only 24 sufficed for the production of young, and only 4 enabled the authors to breed animals to the fifth generation. In these four diets the milk was supplemented by cooked dried beef liver, or yeast, or a combination of ferric citrate and copper sulphate. Liver has been shown to be rich in copper and iron. Inasmuch as rats do well when fed on milk supplemented with ferric citrate and copper sulphate, the authors conclud that it is the presence of iron and copper in liver which makes it an effective supplement of milk. Combinations of milk powder and 5 per cent of liver did not induce more rapid growth, greater size, or greater fertility than did the milk powder supplemented with iron and copper.

W. H. HATTIE

RADIOLOGY

Urography by Uroselectan. Hirsch, I. S., *Radiology* **15**: 480, 1930.

The development of uroselectan as a contrast substance for intravenous urography is indirectly the result of research in the direction of obtaining a contrast medium for cholecystography. This preparation, perfected by Bintz and Rath, is non-toxic, soluble in water and is excreted in sufficient concentration to give good roentgenological contrast. The iodine content is 42 per cent. It can be administered with impunity. The more normal the kidney, the greater and earlier is the excretion, and the better the delineation of the urinary tract. The method permits: (1) visualization of the urinary tract; (2) study of the physiology of the urinary tract; (3) and the determination of the kidney function.

The indications for intravenous urography are: (1) cases in which anatomical and pathological obstacles exist for cystoscopy, ureteral catheterization, or instrumental pyelography; (2) cases in which there is ureteral obstruction which prevents the upward flow of contrast media; (3) cases where instrumental pyelography is definitely contraindicated or impossible.

The technique of administration and roentgen procedure is described. It is admitted that the photographic contrast is not so marked as when instrumental pyelography is used. The new method widens the scope of the roentgenologist's function in urology. It is a safe and simple way of studying the urinary tract in many medical and surgical cases in which the symptoms are not of sufficient gravity to indicate instrumentation or in which instrumentation is contraindicated.

A. STANLEY KIRKLAND

Paravertebral Abscess. Rigler, L. G., Ude, W. H. and Hanson, M. B., *Radiology* **15**: 471, 1930.

Paravertebral abscess occurs in about 80 per cent of all cases of thoracic spine tuberculosis, as checked by careful post-mortem studies. The clinical recognition of abscess is difficult in many cases. The roentgenological diagnosis of abscess is well recognized and is emphasized in all standard books on orthopædic surgery and roentgenological diagnosis. The characteristic shadow of an abscess about the spine is almost pathognomonic of tuberculosis, and is often the first positive evidence of tuberculosis of the spine, frequently appearing before any roentgenological signs of destruction of bone or cartilage are evident. This shadow must be differentiated from that cast by enlarged thymus gland, aneurysm of the aorta, or mediastinal fluid. Occasionally it has been observed that the abscess itself by pressure will cause absorption of the anterior surface of the vertebræ. Illustrative case reports are appended. The article is illustrated by radiographs and schematic drawings. The diagnosis of paravertebral abscess is important, because, alone, it is often the earliest sign of spinal tuberculosis and is confirmatory of the

type of disease where bony destruction is diagnosed by x-ray or clinical methods.

A. STANLEY KIRKLAND

ANÆSTHESIA

Complications of Spinal Anæsthesia. Koster, H. and Weinhob, M., *Am. J. Surg.* p. 1165, June 1930.

This paper is based upon an extensive examination of articles on spinal anæsthesia, which have appeared in English, French, German, Spanish and Italian medical journals, as well as upon 6,000 cases in the writers' practice.

Headache is the most troublesome and most frequent sequel of spinal anæsthesia. It occurs in about 20 per cent of all cases. The cause is still unknown. It has been found that headaches occur least frequently in patients who have been given plenty of fluids before operation. There are two types. One is made worse by raising the head, and is believed to be associated with diminution of cerebrospinal fluid. This form is relieved by the administration of saline infusion. In the other type there are symptoms of meningitis. In meningismus the cerebrospinal fluid is increased and relief is to be sought through the use of diuretics, catharties and hypertonic saline solution given by the mouth or intravenously. A patient in the writers' service was immediately relieved by the intravenous injection of magnesium sulphate.

Incontinence of fæces is a very rare sequel and has always been transient. Retention of urine occurs occasionally. One patient had to be catheterized for eighteen months. The writers found that this complication is much more frequent after inhalation narcosis than after spinal anæsthesia. It occurs usually after operations involving the pelvis or perineum.

Oculomotor paralysis may begin immediately after the spinal puncture or not until the second week afterwards. It usually lasts seven to ten days. One patient did not recover for two months. Abducens paralysis is usually ushered in by a preliminary photophobia. There may be a functional optic neuritis with complete, though temporary, blindness. It must be remembered that eye complications similar to these may occur after lumbar puncture where no injection was made. Meningismus occurred in 10 per cent of the writers' cases. The symptoms were headache, stiffness of the neck, inequality or sluggishness of the pupils, and photophobia. The symptoms lasted for two or three days and then subsided spontaneously. Nine cases of purulent meningitis have been reported among hundreds of patients who have been given spinal anæsthesia. Sepsis, except at the site of puncture, is no contraindication to the use of spinal injections. Damage to the spinal cord or to the nerve roots may result in areas of anæsthesia or paræsthesia, in ulcers, in pain along the course of nerves, in transient anal or vesical incontinence; or in trophoneurotic changes leading to atrophy of muscle groups.

In a series of 1010 operations done under spinal anæsthesia by the writers there were 3 cases of pneumonia, 11 of bronchitis, 4 of dry pleurisy, and 1 of massive collapse of the lung.

W. B. HOWELL

Action on the Human Uterus of Anæsthetics and other Drugs Commonly used in Labour. Bourne, A. W. and Burn, J. H., *Brit. M. J.* **2**: 87, 1930.

The writers took graphic tracings of the variations in uterine pressure during labour, Chloroform was found to cause complete arrest of the pains in the first stage of labour. In the second stage the pains at first became slower and weaker and then stopped. They started again as soon as the chloroform mask was removed. Ether in the first stage slows and weakens pains. The action of ether and chloroform upon uterine action is due to stimulation through the sympathetic system. Nitrous oxide and oxygen were found to have no effect upon the contractions. Spinal anæsthesia with stovain was given to one patient. The normal process of contraction followed by relaxation was interfered with. Relaxation was never complete. Morphine slows the relaxation of the uterus and the rate of the contractions. of the pain on the os and therefore hastens By slowing the relaxation it prolongs the effect of the pain on the os and therefore hastens labour. Atropin was found to cause an increase in the contractions in the one case where it was given. Two patients were given quinine. There was very little evidence of any stimulating action.

W. B. HOWELL

RÔLE OF THE CHEMICAL PATHOLOGIST.—Arthur H. Sanford traces the history of this section, the growth of clinical pathology and the status of the clinical pathologist. The clinical pathologist, he says, is a physician who devotes all or the major portion of his time to diagnosis of disease by laboratory methods. He is a histopathologist and microscopist. He must be a serologist, á bacteriologist and to some extent a parasitologist, a hæmatologist and somewhat of a chemist and physicist. He is also a clinician. In this field of varied interests he must always be up to date and must serve chiefly as a consultant in interpreting and evaluating laboratory data for his medical brethren. Diagnoses by laboratory methods are now accepted. Correlation of laboratory and clinical data must be made by a physician, not by a chemist, not by a technician. In assuming the rôle of the consulting physician on matters of laboratory diagnosis, the clinical pathologist will come into his own. —*J. Am. M. Ass.* **95**: Nov. 15, 1930.

Obituaries

Dr. J. G. Clarke, dean of the medical profession of the County of Grey, also ex-mayor of Meaford, passed away at his home at Meaford, Ont., on October 28, 1930, after a few weeks' illness.

Dr. Clarke was born in St. Johns, graduated in medicine from Queen's University, 1880, and had practised in Meaford and surrounding country for over half a century. He was an associate coroner of the County of Grey. He had been a member of the town council for 16 years and was mayor of Meaford from 1910 to 1913. He is survived by his wife, two daughters and three sons, and one brother, Dr. Adam Clarke, of Winnipeg, Man.

Dr. Harold F. H. Eberts. We regret to have to announce the death from accident of Dr. H. F. H. Eberts, of Montreal, on November 11, 1930.

Dr. Eberts was a graduate of McGill University, both of the arts faculty and the faculty of medicine, obtaining the degree of M.D., C.M., in 1915. He came to the university from Victoria, B.C.

Five years after graduation he received an appointment in the medical faculty as Demonstrator in Biochemistry. He was appointed a junior Demonstrator in Medicine in 1925 and Assistant Demonstrator a few years later, a position he was holding at the time of his death.

A brilliant student and an ardent practitioner with a wide range of interests, he was considered one of the promising young medical men of the city. He was attached to the Western Hospital as an attending physician.

Dr. Robert Gordon Maclellan, of Lunenburg, N.S., died at the Victoria General Hospital, Halifax, on November 9th. Dr. Maclellan graduated at Dalhousie in 1909. After a few months on the staff of the Nova Scotia Hospital, he entered into partnership with the late Dr. A. E. G. Forbes, of Lunenburg, and was engaged in a very busy practice in that town until within a short time of his death, although not in robust health for several years. His early removal is greatly regretted by a large circle of friends.

Lieut.-Colonel James Alexander McCammon, M.D., until last year a resident of Brockville, Ont., as sheriff of the united counties of Leeds and Grenville, passed away on October 21, 1930, at Burnaby, B.C. His appointment as sheriff of Leeds and Grenville was made in 1911, after which he left his medical practice in his native town of Gananoque, where he had worked successfully for many years, coming to reside in Brockville, where he remained until 1929. He is survived by his wife and one son, Dr. J. G. McCammon, of Burnaby, B.C.

Dr. Robert Reddick, of Ottawa, is dead, according to information received on October 16, 1930. Dr. Reddick was born in 1848, and graduated in medicine from McGill University in 1874. He was a member of the Council of the College of Physicians and Surgeons of Ontario from 1895 to 1898.

Dr. William Rundle Walters, of Toronto, died unexpectedly and suddenly on October 14, 1930.

The late Dr. Walters, who was 63 years of age, was born at Audley, Pickering Township, the son of George Walters and Jane Rundle. He was educated at Pickering public school, Whitby Collegiate and the University of Toronto, graduating in medicine with the degree of M.B., in May, 1887. In that month he began practising medicine in East Toronto, and was still in active practice up to the time of his death.

Dr. Walters was greatly interested in public life. His first office was on the school board of York County, to which he was elected in 1887, 1888 and 1889 as trustee for Coleman School. The following two years he was on the Township Council as councillor, and then served eight years as reeve and four years as mayor of East Toronto, bringing it into the city of Toronto free of debt.

Since 1925 Dr. Walters had represented Ward Eight on the Toronto Board of Education, three times receiving acclamations including this year, when he was honoured by being elected to the chairmanship.

Dr. Walters was a Conservative in politics, and a prominent member of the Ward Eight Conservative Association. He was treasurer and a charter member of John Ross Robertson Lodge A.F. & A.M. No. 545, G.R.C., and also a life member of Mimosa and Acacia Lodges, besides being a P.D.D.G.M. of the Masonic Order. Dr. Walters was also a past noble grand in the I.O.O.F.; Supreme Medical Examiner, Sons of England; and a member of the Orange Order, Academy of Medicine and of the Ontario and Canadian Medical Associations.

Surviving are his widow, Mrs. Jane Elizabeth Woodland Walters, to whom he was married in 1887; one son, Dr. W. Ross Walters, Toronto; three daughters, Mrs. Dr. W. Penney, Toronto; Miss Mary E., at home, and Mrs. F. R. Grayson, Moose Jaw; and one sister, Mrs. Mary Perkins, Toronto.

Dr. Alfred E. Wills, formerly of Belleville, Ont., who was chief surgeon in the Yukon for the Royal Northwest Mounted Police before and during the gold rush of '98, died on October 24, 1930, at the age of sixty-two. After Dr. Wills retired from police service he became interested in mining claims in the Yukon District until 1910. During this period his company recorded more than $2,000,000 worth of gold dust. When he returned from the Klondike, Dr. Wills became associated in mining ventures in Manitoba and Northern Ontario. His father, the late Thomas Wills, was County Treasurer of Hastings County, Ontario.

Dr. Wills was a graduate of Trinity Medical College, Toronto. He is survived by two brothers, Mr. H. T. Wills and Judge J. W. Wills, of Belleville, Ont., and by one sister, Miss Annie Wills, in London, England.

THE HEART IN PREGNANCY.—A search made by William D. Reid of the records of the Boston City Hospital for a period of twelve and a half years disclosed twenty-seven cases of definite stenosis of the mitral valve. Seven of these were in men. The average age at death of these twenty seven patients was 43.2 years. The average age at death was 42.4 years for married women with heart disease and 47.2 years for those that were unmarried. The married women in the group analyzed averaged 5.75 children. The mortality from cardiac disease in pregnancy is but slightly greater than that of cardiac patients of similar age in the general population. Probably 90 per cent or more of cardiac patients survive pregnancy and parturition. He concludes that married women with rheumatic heart disease die before their time because of the natural evolution of this disease rather than because of child-bearing. This fact should be given consideration when advising women with heart disease regarding marriage and pregnancy.—*J. Am. M. Ass.* **95:** Nov. 15, 1930.

News Items

BRITISH EMPIRE

Birth Control in India

It is reported that the State of Mysore in India has given official sanction to the establishment of birth-control clinics at the four principal hospitals on the basis of suggestions put forward by Dr. Subba Rao, the senior surgeon of Mysore and the Principal of the Medical College of Bangalore. Mysore is the first state in India, or indeed in the British Empire, to take such official action. Contraceptive appliances will be kept in store at the various clinics and instruction as to their use is to be given by female physicians. Contraceptive advice is to be given only to married women who need it for considerations of health or for economic reasons.

Health Week in Trinidad

Health week was observed in Port-of-Spain, Trinidad, from October 11th to 18th. The Governor opened an exhibition illustrating the nutritive values of various kinds of food; the production of clean milk; the rearing of healthy children; and the campaigns against malaria, tuberculosis, enteric fever, and other diseases. Dr. G. H. Masson, Medical Officer of Health, delivered an address in which he commented on the remarkable decline in recent years in tuberculosis and enteric fever. He appealed for the establishment of a permanent health and hygiene museum.

GREAT BRITAIN

Survey of an Influenza Epidemic at St. Andrews

An account of an epidemic outbreak of "influenza", which affected 759 persons, is given by Dr. G. Matthew Fyfe, medical officer of health for St. Andrews, in his annual report for 1929. The information was collected by the clinical staff of the James Mackenzie Institute for Clinical Research, the members of which are in general or specialist practice in the town, and are therefore in a position to report upon conditions affecting all sections of the community. Sporadic cases of an acute febrile illness appeared between January 7th and 10th; by February 1st 40 per cent of the children were absent from the schools, and it was not until March was well advanced that normal conditions prevailed. The comparatively mild course of the disease and the relative absence of fatal result differentiated the outbreak from the acute epidemic influenza prevalent in 1918-19, while it was distinguished from ordinary winter cold by the high incidence, sudden onset, and the marked prostration which followed the subsidence of the acute symptoms. In the majority of cases the incubation period seldom exceeded forty-eight hours. Infection of an entire household, even under conditions of over-crowding, was exceptional. At the beginning of the outbreak, adults, especially young adults, were more severely and more frequently infected than children. Routine bacteriological examinations furnished no definite conclusions. Attempts to isolate *Bacterium pneumosintes*, as described by Olitsky and Gates, were unsuccessful. In some instances an organism morphologically resembling Pfeiffer's bacillus was observed in mixed culture, but attempts at isolation failed. Pneumococci were detected in other cases. In many, a streptococcus was found, insoluble in bile, producing a green colouration on blood agar; it occasionally appeared as large diplococci varying in sugar reaction and with chains not always reacting uniformly to Gram's stain. Animal experiments were not undertaken. The only conclusion reached was that a pleomorphic streptococcus seemed to be related to the infection, though the relationship may have been very remote. None of the usual drugs had any marked effect upon the course of the disease. Various prophylactic measures were tried, most of them without success. Persons who had received prophylactic inoculations proved no more resistant than others. Some whose throats were daily painted with iodine were attacked, but regular gargling had some effect in warding off the disease. Considering its incidence, the death rate was remarkably low; six deaths were reported altogether, five of these being of persons over 60 years of age. No relationship was established between the outbreak and the prevailing climatological conditions, but there were indications that fewer cases occurred and that patients felt better in dry, frosty weather. Another matter referred to by Dr. Fyfe in his report is the organization of the national health insurance scheme, which he considers is in need of revision. From a study of panel records he thinks that the administration of the Act should be more intimately linked up with the administration of public health. If the work of the general practitioner was co-ordinated with that of the medical officer of health, their concerted efforts, in his opinion, would enable a thorough investigation of the health of the nation to be made.—*Brit. M. J.* **2**: 301, 1930.

Royal College of Physicians of Edinburgh

A quarterly meeting of the Royal College of Physicians of Edinburgh was held on November 4, 1930, the President, Sir Norman Walker, in the chair.

Drs. Henry Leonard Wallace (Edinburgh) and William Brown, O.B.E. (Aberdeen) were introduced, and took their seats as Fellows of the College.

Drs. Earle Macbeth Watson (Ontario), Wm. Archibald Mein (Bournemouth), Agnes Rose Macgregor (Edinburgh) and James Davidson (Edinburgh) were elected Fellows of the College.

The Hill Pattison-Struthers Bursary in Anatomy and Physiology was awarded to Maurice Goldfar. The Hill Pattison-Struthers Bursary in Clinical Medicine was awarded to Robert Leitch Allan.

An R.A.M.C. Museum at Chelsea

A museum, which also serves the purpose of a library and study centre, has been established at the Duke of York's Headquarters, Chelsea, for the use of the officers and men of the Royal Army Medical Corps, 47th (2nd London) Division, T.A. It consists at present of only one room, though there is every sign that it will soon

overflow into others, but it has been pleasantly furnished and equipped with a number of interesting and educative objects.

The museum was opened on July 26th by Lieut.-General H. B. Faweus, C.B., Director-General Army Medical Services, who explained that the idea originated in the mind of the curator, Captain H. A. C. Gregory, who wished to improve the educational standard of the R.A.M.C. recruit, and considered that, in order to get a proper grasp of the subjects in his curriculum, a man needed not only his manual, but recourse to models, specimens, slides, and the like. Captain Gregory therefore approached Colonel L. D. Bailey and the other R.A.M.C. officers of the Division, who encouraged the project by every means in their power, and help was enlisted from many quarters, including the County of London Territorial Army Association and the Royal Army Medical College at Millbank. General Faweus highly praised the conception, and expressed the hope that the museum would more than fulfil the ambitions of its promotors. Colonel Bailey stated that it was the intention to have weekly lectures in the museum by specialists in their respective subjects, and the museum would be open every day for the use of officers, non-commissioned officers, and men; it was hoped to make it in time a thoroughly equipped school of instruction.

ALBERTA

The operation of the Calgary Municipal Hospitals for the first nine months of this year ended with a deficit, or charge to the mill rate, of $92,789.95. Expenditures from January 1st amounted to $231,713.11 while revenue totalled $138,923.16. The shortage is in line with the estimates made at the beginning of the year.

The total number of students enrolled in the medical department of the University of Alberta for 1930-31 is 151. There are only 14 in the first year and 31 in the final year.

Recently the College of Physicians and Surgeons of Alberta received a complaint that certain physicians in a town refused to answer any calls to the country, and insisted that all patients regardless of the necessity should go to the hospital. The Council investigated the charge, which had been forwarded to a local branch of the United Farm Women of Alberta, and found that there was nothing in the complaint, but that the organization was requesting the Government to send them in a municipal doctor to be paid by the province, and, in order that absolute necessity be shown for this request, made the charge largely out of their own imagination, so the secretary admitted.

The last of this year's post-graduate tours under the auspices of the Canadian Medical Association took place during the early part of November. The lectures were given by Drs. L. H. McKim and C. C. Birchard of McGill University. Each one was of great practical interest to the surgeon and to the physician and all were thoroughly enjoyed and appreciated. At Medicine Hat physicians travelled as far as 110 miles to hear these speakers. In the Crow's Nest Pass, at Blairmore, all the physicians besides others from Eastern British Columbia and the adjacent prairie towns were present. Be it said that in Calgary so enthusiastic were the members of the profession that they suggested that a post-graduate course lasting one week should be arranged for, when if necessary a fee would be charged those attending.

At the Holy Cross Hospital, Calgary, during the morning of November 6th Dr. L. H. McKim gave a very instructive lecture on "Fractures of the ankle joint", with special reference to Pott's fracture, dealing with the classification and methods of treatment in a most thorough, painstaking way. Dr. C. E. Birchard followed with an extremely interesting discussion of the cardiac arrhythmias, illustrated with many electrocardiograms. During the evening Dr. McKim gave a splendid lecture on "Infections of the hand", showing by means of lantern slides the various types and pathways by which infections spread, and the best methods, in his opinion, of treating these. Dr. Birchard's evening lecture was on "Thrombosis of the coronary arteries" and was graphically illustrated with lantern slides.

The annual meetings of the Alberta Hospital Association and the Alberta Association of Registered Nurses was held in Calgary on November 13th and 14th. Among the speakers were Dr. M. R. Bow, Provincial Deputy Minister of Health, Dr. G. Harvey Agnew, of Toronto Dr. Malcolm T. MacEachern of the American College of Surgeons, Chicago, and Miss M. R. Simpson, Director of Nursing for Saskatchewan.

G. E. LEARMONTH

BRITISH COLUMBIA

Dr. J. W. McIntosh, who has been for some years Medical Officer of Health in the Municipality of Burnaby, has been appointed in succession to Dr. F. T. Underhill as Medical Health Officer of the city of Vancouver, B.C.

Dr. James Urquhart, of Aklavik at the mouth of the Mackenzie River, is visiting relatives in Vernon, B.C. It is stated, that with the exception of the physician stationed at Spitzbergen, Dr. Urquhart enjoys the distinction of practising "farthest north".

On October 9th the annual golf tournament of Vancouver and Lower Mainland was held at the Jericho Golf and Country Club—63 contestants teeing off. Dr. J. E. Harrison carried off the Worthington Cup with the lowest gross score; Dr. Colin Graham had the lowest net score and Dr. T. K. McAlpine the lowest gross for the season. The match concluded with a most enjoyable dinner.

On October 6th Dr. J. B. Collip, who was passing through Vancouver, addressed the Vancouver Medical Association on recent work in endocrinology.

A strong committee is at work on the plans for the meeting of the Canadian Medical Association in Vancouver in June, 1931.

Dr. A. K. Haywood, the new General Superintendent of the Vancouver General Hospital, has assumed his duties. On November 6th he was the guest of the Board of Directors of the Hospital at a dinner to which representatives of the various organizations interested in hospital matters were invited.

C. H. BASTIN

MANITOBA

On November 20th medical men of Winnipeg and their wives met at the Royal Alexandra Hotel to wind up the affairs of the local committee of arrangements for the British Medical Association meeting. After high tea those present heard reports and viewed the moving pictures taken during the B.M.A. meeting by Dr. A. M. Davidson. Dr. Harvey Smith, President of the British Medical Association presided over a most happy gathering.

The new wing of the Selkirk General Hospital was opened on November 11th.

On St. Luke's Day, October 26th, some forty-three members of the Winnipeg Medical Society in academic dress attended divine service in a body at St. Luke's Church on the invitation of Canon Bertal Heeney, the rector, who preached from the words, "To whom shall we go?"

Dr. E. S. Moorhead has been elected President and Dr. E. J. Boardman, Honorary Secretary of the Committee on Medical Service appointed by the College of Physicians and Surgeons of Manitoba and the Manitoba Medical Association to collect and correlate data in connection with medical economics and public medical services. Major Robert Shankland, V.C., 101 Medical Arts Building, Winnipeg, is secretary of the committee.

A short but impressive memorial service was held in the Medical College at 11 a.m. on Armistice Day, to commemorate those of the faculty and students who gave their lives in wars for the Empire. Dr. J. A. Gunn, formerly O.C. No. 1 Canadian General Hospital, gave the address.

ROSS MITCHELL

NEW BRUNSWICK

The tourist season, now almost at a close, has provided the usual number of accidents on the roads of the province. In a very minor proportion of these cases have the hospitals in the province been able to collect the charges for the services rendered to the accident victims. It is a sufficiently serious matter when the residents of our own province, injured in automobile accidents, are unable to pay their hospital charges. The matter is even more serious when foreign visitors become charges on the public service of our local institutions. This is a matter which concerns every province in Canada and no plan has yet been evolved to correct a very evident abuse.

The Provincial Branch of the Red Cross Society is at present engaged in an active canvass for funds. The support received will probably be curtailed by the present stringency in money matters, but it is hoped that a satisfactory amount will be collected.

The Red Cross in New Brunswick maintains a service to the ex-service men, as elsewhere, and, besides, it maintains outpost hospitals in localities where the population is not sufficiently dense to maintain a local hospital. Col. Biggar was a welcome visitor in New Brunswick at the opening of this campaign.

Sir James Dunn, of London, England, formerly of Bathurst, has presented his "Vale Farm", consisting of 1,100 acres, to the Roman Catholic Bishop of Chatham. This beautiful farm, with nearly 300 acres under cultivation, is situated near the mouth of the Tetigouche River, a short distance from Bathurst. Extensive and valuable buildings are on the property. Only two years ago Sir James erected a new house at a cost of $40,000.00. It is reported that the Bishop of Chatham will construct a tuberculosis hospital at a cost of $200,000.00 on this site. This report is in line with a movement which has been going forward for some time with a view to having a Tuberculosis Sanatorium on the north shore of the province.

Dr. John Nugent and Dr. Robert Pendrigh, of Saint John, have returned to their practices after attending the summer surgical course at the University of Edinburgh.

Dr. G. A. B. Addy, of Saint John, was appointed Regent of the American College of Surgeons at the recent meeting in Philadelphia.

Dr. L. DeV. Chipman, of Saint John, was elected President of the Saint John District Boys Scout Association on October 10th.

A. STANLEY KIRKLAND

Dr. E. J. Ryan, for some years the secretary of the New Brunswick Medical Society and correspondent in that province for the *Journal* has returned from the United States and established himself in practice in his native city, Saint John, N.B. Dr. Ryan has been for some years on the faculty of the medical school of the University of Pennsylvania, and returned to Canada to accept an appointment on the staff of a large hospital in Montreal where he hoped to settle permanently. The Medical Law of Quebec, however, prevented his opening an office until October, 1931, despite the fact that his qualifications were acceptable and that he was eligible for Dominion registration without examination or other formality. He proposes now to specialize in urology and in the treatment of venereal disease.

NOVA SCOTIA

Dr. E. Gordon Young, Professor of Biochemistry at Dalhousie University, has been elected president of the Nova Scotian Institute of Science.

The Payzant Memorial Hospital, Windsor, recently completed its twenty-fifth year of activity, and graduated its first class from its training school for nurses.

At the annual meeting of the Provincial Medical Board of Nova Scotia, held at Halifax on November 6th, Drs. J. G. MacDougall and W. E. Hattie were re-elected President and Registrar, respectively.

Graduating exercises of the training school of the Nova Scotia Hospital were held on the evening of

October 30th. Hon. John Doull, Provincial Secretary, presided and presented the diplomas and prizes. Dr. A. MacD. Morton, of Halifax, addressed the graduates. Several speakers complimented Dr. Lawlor and his associates on the excellent administration of the hospital and school.

Several of the branches of the Medical Society of Nova Scotia have profited recently by lectures arranged by the Committee on extra-mural post-graduate teaching of the Canadian Medical Association. The personnel of teams included Drs. R. St.J. Macdonald, R. E. Powell and M. Seng, of Montreal, and Drs. H. B. Atlee and G. R. Burns, of Halifax. Dr. D. Murray, president of the Medical Society of Nova Scotia, accompanied the teams to some centres and spoke on the importance of medical organization.

It is reported that the tenders received for the construction of the proposed new infirmary building of the Nova Scotia Sanatorium are all so greatly in excess of the estimated cost of the building that considerable revision of the plans will be made and new tenders asked for.

Drs. C. E. Kinley, and N. H. Gosse, of Halifax, and Dr. F. R. Davis, of Bridgewater, were made Fellows of the American College of Surgeons at the meeting of the College held recently at Philadelphia. The late Dr. F. E. Gullison, of Yarmouth, had also been elected to the Fellowship, but his untimely death came before the award could be made.

At a largely attended meeting held at Halifax on October 16th, when representatives, including a number of physicians, from all sections of the province were present, it was decided to form a Nova Scotia Society for Cripple Children. Mr. J. C. Gass, of Halifax, was elected president of the new organization. Mr. Edgar F. Allen, of Elyria, Ohio, widely famed for his interest in crippled children, affectionately called "Daddy" Allen, was in attendance and gave the new society his blessing.

W. H. HATTIE

ONTARIO

The Academy of Medicine of Toronto announces a second series of lectures on subjects of special interest to the practitioner. These lectures will be held on Wednesdays at 4.30 p.m. Each Fellow is privileged to bring as a guest a regular medical practitioner who is not a Fellow of the Academy.

The subjects and the lectures are as follows.

December 10th.—"General principles in the treatment of fractures," G. E. Wilson.

December 17th.—"Bronchiectasis, its high incidence in general practice as revealed by the use of lipiodol," A. H. W. Caulfeild.

January 7th.—"Infant feeding," G. R. Pirie.

January 14th.—"Management of the infirmities of old age," William Goldie.

January 21st.—"Renal pain, diagnosis and treatment," Robin Pearse.

January 28th.—"Diseases of the teeth and jaws," E. F. Risdon.

February 4th.—"Deafness—prevention, differential diagnosis and cure," R. S. Pentecost.

February 11th.—"Psychiatric conditions in general practice," C. B. Farrar.

February 18th.—"Radium—proven uses and limitations in therapy," G. E. Richards.

February 25th.—"Problems of the nervous child," W. E. Blatz.

It is hoped that further addresses will be given later.

Each speaker has been asked to present modern methods of diagnosis and treatment of the subject discussed, avoiding as much as possible purely speculative and theoretical aspects.

There were 26 new cases of infantile paralysis in Ontario for the week ending October 25th, according to a report issued by the Provincial Department of Health on November 1st. This was an increase of 10 cases over the number reported in the previous week.

Of the number of new cases reported, Toronto headed the list with 16; York Township had 4; London 3; Humberstone and Walpole 2 each. One case each was reported from the Border Cities, Ottawa, Darlington, Scarboro, Owen Sound, Sunnydale, Erin Township, St. Catharines and Smith.

However, the situation was rapidly assuming a normal state the number of cases falling off, according to the Ontario Department of Health report, issued on November 14th.

For the week ending November 2, there were only 17 new cases in the province as compared with 35 the previous week. Toronto contributed 10 of the 17 new cases reported. Up to, and including November 8, there were 625 cases with 50 deaths reported to the department this year as compared to 524 cases and 26 deaths for the corresponding period of 1929.

Officials of the department state the worst of this year's epidemic is over, basing their belief on the fact that since October 18, new cases have been falling off at the rate of 10 per week.

It is reported that the National Committee for Mental Hygiene has appointed Dr. C. M. Hincks, Toronto, General Director, to Succeed Dr. Frankwood E. Williams, who is retiring.

Dr. Hincks, founder and medical director of the Canadian National Committee for Mental Hygiene, will assume his new office with the United States organization on January 1, 1931. He will remain in Toronto and will continue as medical director of the Canadian committee, thus becoming the leading figure in mental hygiene in North America.

QUEBEC

The Medical Association of the Province of Quebec has elected the following officers: *President*, Dr. P. C. Dagneau, Quebec; *First Vice-president*, Dr. J. R. Bellisle, Hull; *Second Vice-president*, Dr. H. S. Shaw, Outremont; *Third Vice-president*, Dr. L. F. Dubé, Notre-Dame du Lac; *Secretary*, Dr. L. Gérin-Lajoie, Montreal; *Treasurer*, Dr. E. Trottier, Montreal; *Council*, Drs. G. Archambault, A. T. Bazin, C. C. Birchard, B. G. Bourgeois, A. Brassard, L. Charpentier, C. E. Cross, A. Thibaudeau, E. Tremblay, J. Stevenson, J. R. Pepin, A. J. McCabe, J. Guérard, and O. Demers. The next meeting of the Association will be held in Quebec.

A report issued recently by Dr. S. Boucher, Director of Public Health in Montreal, covering typhoid fever, infantile paralysis and diphtheria, as reported to the health offices, is as follows:

Infantile paralysis cases reported since January this year total 7, as against 32 for the same period last year. Diphtheria cases from January 1st to the end of September this year totalled 656 with 52 deaths, as compared with 847 cases and 83 deaths in 1929. Typhoid fever accounted for 72 cases and 13 deaths so far this year as against 78 cases and 19 deaths for 1929. The month of September had 13 cases and 5 deaths while last year the same month had 18 cases and 2 deaths. For the last week in September this year there were 3 cases and 1 death, while in 1929 the same week showed 11 cases and 1 death.

Montreal had a small outbreak of typhoid fever during the months of September and October. From the first of the month 81 cases were reported to the department of health as follows: for the week ending October 4, 11 cases, October 4-11, six cases; October 11-18, 23 cases and October 18-23, 29 cases. From October 23-30 there were 12 new cases but in the period from Sunday to Thursday the week previous, 17 cases had been reported, a drop of five cases, or an average of one case a day less in the five-day period.

The Board of Health has taken every precaution and it is the opinion of the health authorities that danger of further spread is past.

In the week ending October 26, there were 14 cases, while in the week ending October 14 there had been 29, a diminution of over 50 per cent. There were 95 cases during the whole month of October. At the time of going to press there had been no new cases for a week.

The Board of Health of Montreal dealt recently with the contract between the City and the Notre Dame Hospital for the care of contagious cases at the reconstructed St. Paul Hospital.

The hospital will be erected on the site of the present smallpox hospital at Sherbrooke and Moreau Streets, and will be built and maintained by the Notre Dame Hospital. The city will pay the hospital $3.30 a day for 25 years for each bed occupied.

If during and at the end of that time the hospital manages without a deficit the site will become the property of the hospital. The city will guarantee the debt incurred for construction if any. If there should be an outstanding deficit at the end of the twenty-five years the city will become proprietor of the hospital. The institution will have accommodation for 300 beds.

This contract has been approved by the Board of Health and will be adopted by the city within a short time.

The Montreal General Hospital is faced with an accumulated deficit of $500,000. The Chairman of the Executive Committee of the Montreal City Council, Alderman Bray, stated that the city would make a grant to relieve the situation. The members of the Executive and Some of the civic officials were guests of the hospital at a luncheon. A visit to the institution was made and the civic administration was impressed by the immense amount of good work being accomplished.

Dr. L. J. Rhea, pathologist at the Montreal General Hospital, and Associate Professor of Pathology at McGill University, has been selected to go to London to do research work there on insular sclerosis, in connection with the microörganism recently described by Miss Chevassut.

Dr. Rhea's expenses are being defrayed by T. B. Macaulay, and the Sun Life Assurance Company.

A half-million dollar addition to Laval University, Quebec, is planned for next spring.

The building, which is to be for the faculty of law and medicine, will include the cancer institute and the biological laboratories. A number of buildings are to be demolished at the corner of Hebert and St. Famille Streets to make way for it.

Charging abuse of the free dispensaries maintained by the City of Quebec and demanding that the municipal authorities take the necessary steps to bring this to a halt, so as to ensure that only people who are unable to pay for doctors' services are treated, a delegation of physicians waited upon Mayor Lavigueur and Dr. V. Martin, head of the Municipal Health Bureau, at the City Hall, on November 14th.

Explaining the objects of the delegation, Dr. Vallée pointed out that a number of free dispensaries had been established throughout the city, some by the city and others by charitable societies, in order that poor people might receive free vaccination and other medical treatment. "These dispensaries have been abused shamefully", Dr. Vallée declared. "Well-dressed patients who could obviously afford to pay doctors' fees for treatment have driven to the dispensaries in automobiles or taxis and demanded treatment free. The dispensaries were established only for those who could not afford to pay for treatment and it is an abuse for any other people to ask for treatment."

Dr. Valmont Martin, on behalf of the City Health Service, declared himself in sympathy with the doctors' point of view, declaring that until some means of checking the abuse was found the dispensaries could not fulfill their real purpose.

A proposal that doctors' certificates proving that the patient in question was deserving of free treatment should be produced was then put forward by members of the delegation. Doctors who attend poor families, it was argued, generally could tell whether or not the family could afford to pay for treatment.

Mayor Lavigueur declared that he was in favour of any plan which would insure the dispensaries functioning to the limits of their usefulness and declared that the city would be willing to coöperate with medical men in any reasonable scheme.

Adoption of a doctor's certificate system was agreed upon by the city authorities and the doctors as the best solution of the problem, and it was decided that the plan should be drawn up more fully by the doctors and submitted to the city authorities for approval.

The electors of the City of Quebec have recently been considering the question of chlorination of the city's water supplies, and, apparently, there has been a great deal of opposition to the proposal. We learn now that the whole question was referred to the Medical Society of Quebec by the Quebec City Council, and has been approved by it by a very large majority, ninety-seven to three.

A resolution expressing the attitude of the society was adopted and sent to the City of Quebec.

Dr. J. Ernest Gendreau, professor at the University of Montreal, has been elected *President* of the Association Canadienne Française pour l'Avancement de Science. The other officers for the ensuing year are: M. Adrien Pouliot, *Vice-president;* Dr. Antoine Barbeau, *Second Vice-president;* M. Jacques Rousseau, *Secretary;* M. Victor Doré, *Treasurer.* It has been decided to give seven popular lectures during the year. The societies represented in this Association are as follows: La Société Médicale de Biologie; la Société Canadienne

d'Histoire Naturelle; la Société de Chimie; la Société de Physique; la Société de Mathematiques et d'Astronomie de Montréal; la Société de Mathematiques et d'Astronomie de Québec; and la Société Linnéenne de Québec.

Fifty years' service to the Hôtel Dieu, Montreal, from 1880 to 1930, was recognized recently by the nuns, doctors, internes and nurses of that institution when they united in tendering their congratulations to Dr. James J. Guérin at a luncheon in his honour. Dr. Guérin was the recipient of many gifts, including a large cup inscribed with the names of all the staff and a silver facsimile of the record of the first patient of his who was discharged from the hospital cured. The nuns of the hospital kitchen also presented him with a huge birthday cake with 50 candles, and the tribute of the nurses was a great bouquet of flowers.

Rev. A. Bernard, chaplain of the hospital, praised the devotion that Dr. Guérin had always shown in his duties, particularly when it came to looking after the sick poor in the public wards. He had given unstintedly of his skill and patience, the chaplain said, and was, in every sense of the word, a Christian gentleman.

Dr. D. Hingston, president of the medical board of the hospital, said that no matter what position Dr. Guérin occupied, whether Provincial cabinet minister, Mayor of Montreal, or Federal member, he always put his duties at the Hôtel Dieu first. "He will be most honoured for the work he did in the public wards of the hospital," Dr. Hingston stated.

Dr. E. Fortier had been a pupil of Dr. Guérin's and what had always amazed him was the perpetual youth of his instructor, whom he described as being "74 years young".

Dr. Lucien Piché, an interne, spoke of Dr. Guérin's action in having the interne system introduced into the hospital. He made the presentation of the engraved facsimile of Dr. Guérin's first patient's record. Dr. Hingston presented a silver cup and Nurse Charlotte Labrosse presented roses.

Replying, Dr. Guérin recalled changes in the hospital since 1880, when he first became a member of the medical staff, speaking amusingly of the times when the gates were locked at 7 o'clock at night, and a hammer was hung outside with which people who wished to enter would knock resoundingly on the gates. "There were no ambulances or elevators in those days," said Dr. Guérin, "and not a great deal of modern medical apparatus, but we still managed to make our diagnoses fairly accurately." He paid high tribute to the nuns of the hospital and to their founder, Jeanne Mance.

SASKATCHEWAN

The twelfth annual meeting of the Saskatchewan Hospital Association was held at Saskatchewan on November 11th and 12th. Among the speakers was Dr. H. C. Boughton, superintendent of the Saskatoon Sanatorium, who thanked hospital officials for laying aside certain wards where tuberculous patients could be treated, and for providing services and facilities for the hospital clinics that were maintained by the Anti-Tuberculosis League in some of the larger centres of the province.

Dr. F. C. Middleton, Deputy Minister of Public Health for Saskatchewan, said, "The time has now arrived when consideration should be given by hospital boards to the building of convalescent homes rather than adding to hospitals. Many cases now in hospital could be safely taken care of in such a home at much less expense than treating the case in a regular hospital". He stated that the value of hospital buildings in Saskatchewan at the end of 1929 was $7,064,619, showing an increase of $437,573 over the previous year. In 1929 one person in every 13 in the province had hospital treatment. The increase in patients in 1929 was 3,636. With a population of 866,700 there was an average number of 2,663 patients in hospital every day.

During 1929 two hospitals were added to the list of government-aided hospitals, bringing the total up to 57. These were managed under various auspices; the Sisters' hospitals numbered 15, with a bed capacity of 1,125; ten municipal hospitals had 1,098 beds; two sanatoria had 360 beds; 18 union hospitals had 446 beds; 3 church hospitals had 104 beds; 5 community hospitals had 98 beds; 3 private hospitals had 89 beds; one V.O.N. hospital had 9 beds; the Red Cross Outpost Hospitals had 123 beds. The total number of beds in government aided hospitals was thus 3,552.

With 6,157 living births in hospitals there were 40 maternal deaths. This gives a maternal death rate of 6.5 compared with a rate of 6.2 for the whole province.

Greater coöperation between medical staffs, boards of trustees and hospital staffs was urged by Dr. G. Harvey Agnew, Toronto, secretary of the department of hospital service of the Canadian Medical Association.

A. Esson, of Rosetown Union Hospital, said that the word "indigent" had not yet been successfully defined. He thought that clauses referring to indigent patients in municipal and hospital legislation should be replaced by clauses with "teeth". This might be done by compelling by statute territory abutting on hospital areas to guarantee their accounts, if not to take some percentage of capital investments and expenditures.

Dr. E. E. Shepley said that there was almost complete agreement among radiologists that the plates sent in from outside institutions for interpretation were useless and pointed definitely to inefficient x-ray laboratories. He urged the representatives of smaller hospitals to equip themselves with x-ray apparatus and place a well-trained nurse in charge.

Dr. W. S. Lindsay pointed out that a very light expenditure was required for operating a small but efficient laboratory that could take care of many of the tests required in the smaller hospitals.

Hon. F. D. Monroe, Minister of Public Health for Saskatchewan, stated that the first psychopathic ward would be opened in Regina early in December and as conditions warranted the work would be extended to other centres of the province. The two mental hospitals have 2,000 patients at present; the net increase each year is 200 which means that the government under the present system would have to build a new hospital for the mentally ill every three years. Many of the mental patients now in Battleford or Weyburn were in an advanced stage and could not be helped much. When the mental patient was discharged he often had great difficulty in rehabilitating himself; a system of social service nursing was being started to aid such. The function of this body will be to examine the history of each mental case and see who can be placed in gainful occupations where mental conditions will be favourable. Dr. Munroe also announced that work in the cancer program would begin in Saskatoon in January with the erection of an emanation plant at the university. This plant will be the second of its kind in Canada, the other one is in Montreal.

The following resolutions were passed:—

1. That legislation be enacted by order-in-council making reciprocal action between provinces in collecting fees of indigent patients from rural municipalities possible.

2. That the Union Hospital Act be amended to define the boundaries of union hospital districts more carefully and establish the location of hospitals.

3. That the provincial government enact legislation facilitating collection of fees by the hospital from rural municipalities, cities, towns and villages for indigent patients.

4. That the association approves the proposed arrangement with the Workmen's Compensation Board for payment of hospital fees of patients coming under the act.

5. That the federal government be asked to amend the criminal code by placing a person who gives an N.S.F. cheque to a hospital in the same position as one who attempts to pay a hotel bill in the same way.

6. That a committee be appointed to investigate the cost of hospital fire insurance with a view to reducing the same.

7. That the association favours the policy of continuing the work of the travelling dietitian, but that the department of health assume the entire cost of salary and travelling expenses in hospitals where no training is maintained.

8. That the association express appreciation to the federal government for recent exemption from duty of certain hospital supplies and trusts that further steps may be taken to assist hospitals in financing.

Fifty officials engaged in public health work in the province attended the fifth annual convention held in Regina. The sessions occupied two days. Attending the convention were medical health officers, public health nurses, veterinary officers, sanitary engineers, registrars, inspectors, and officials engaged in public health work.

Dr. W. R. Coles, of Regina, pointed out in his presidential address that unemployment increased the work of the health officer. Overcrowded living conditions, scant clothing, and poor food, resulting from poverty, brought about lower health standards.

Survey of the public health nursing service was made by Miss Ruby Simpson, Director of Nursing Services, Department of Public Health. In the past two years generalized nursing, as contrasted with specialized nursing, had been adopted in the province. This included all types of public health nursing, prenatal, pre-school and school, tuberculosis, trachoma, and home nursing classes. Nineteen nurses were engaged in public health nursing in the province. These included three who worked in conjunction with the Victorian Order of Nurses. In 1929, 240 pre-natal calls had been made; in connection with infant welfare 1,912 visits had been made. For the pre-school child 125 pre-school clinics had been held. Local doctors had given their time without remuneration to the Department of Health when requested to do so by the public health nurses where the clinics were held. In 1929, 837 schools had been visited. Trachoma work was carried on by every nurse, and the investigation and follow-up work of tuberculosis patients was an important part of the nurses' duties. Instruction in home nursing was given to senior and junior groups, including mothers and school children. Eighty groups were conducted for women in the province, and 103 groups were held for school children over twelve years of age. The nurses also organized and assisted the local doctors in immunization and vaccination campaigns.

The protection of the milk supply was one of the greatest problems to be met by the city health inspector, according to Ronald Gilbert, of the city health department, Prince Albert. Stricter enforcement of regulations governing the use of individual drinking cups and covered containers by those in charge of booths and concessions at circuses and fairs was urged.

In less than ten years, deaths from cancer in the province have been doubled, according to Dr. R. O. Davison, chairman of the Saskatchewan Cancer Commission, in discussing the cancer problem. In 1919 cancer deaths were 3.8 per cent of all the deaths; in 1928 cancer caused 7.6 per cent of all the deaths in the province. About 30 per cent of cancer was seen early enough to be cured, another 30 per cent could be relieved, and the remainder could not be treated, because the patients did not present themselves in time.

Examination of restaurant employees was discussed. The members of the Association seemed to be under the delusion that venereal disease was transmitted through food, so much time was spent on how best this condition could be detected. The present law causes much dissatisfaction among employers and employees, because they hate to pay the fee for medical examination, and among the doctors because they dislike doing a thorough examination, including a Wassermann and a smear, for a dollar, which is all the restaurant worker wishes to pay. No improvements in the law were suggested.

It was stated in the discussion on tuberculin testing of dairy cows that more than 10 per cent of the children suffering from tuberculosis in the province had the bovine infection.

Many doctors do not know how to fill out a death certificate properly according to the registrars present. The chief faults are giving causes that are not listed in the national classification, for example, "heart failure." If the Medical Health Officer is in doubt as to the cause of death he does not need to give a burial permit until the cause of death has been ascertained. He may refer the case to the coroner who can order an autopsy. Births must now be registered within fifteen days by the parents instead of thirty days as formerly.

The members of the Association and their wives were guests at a banquet given by the Regina Board of Trade at which Hon. F. D. Munroe, Minister of Health gave an address.

The following officers were elected for next year: *President*, Dr. W. R. Coles ,Regina; *Vice-president*, Dr. R. G. Ferguson, Fortsan; *Secretary-treasurer*, R. H. Murray, M.E.; *Executive*, Miss C. R. Peers, Reg.N., Regina; Dr. D. P. Miller, Prince Albert; C. Jamieson, Swift Current; J. C. Malek, Yorkton; Dr. W. H. Orme, Saskatoon; S. Cartlidge, Moose Jaw.

The establishment of the first psychopathic ward in connection with a hospital between Vancouver and Winnipeg has been given final approval by the Board of Governors of the Regina General Hospital. An agreement has been made between the Board and the provincial Department of Public Health which covers a period of five years. The government will pay a rental of one dollar a year for the premises and will pay all costs of maintenance and upkeep of its section of the building. The government will pay the salary of a physician who has specialized in neurology, will pay for orderlies, for a social service nurse, and for a vocational worker. The government will also furnish $6,000 for equipment, most of which will become the property of the hospital at the termination of the contract. In addition the government will pay a grant of one dollar per patient per day in addition to the amounts collected by the hospital. It will also pay the usual hospital fees for x-ray and other services.

The building to be used for this purpose was formerly the Nurses' Home. The part not needed for the psychopathic ward wil be used for patients with communicable diseases. The small-pox cases will be cared for in another building, though it was pointed out that there is no real reason why they should not be cared for in the same place as other patients since all nurses are vaccinated.

LILLIAN A. CHASE

UNITED STATES

The American Board of Obstetrics and Gynæcology, Inc.

The American Board of Obstetrics and Gynæcology, composed of nine members and examiners, elected by the American Association of Obstetricians, Gynæcologists, and Abdominal Surgeons, the American Gynæcological Society, and the Section in Obstetrics, Gynæcology, and Abdominal Surgery of the American Medical Association, was formally organized in Niagara Falls, N.Y., September 16, 1930. The Board will grant certificates indicating proficiency and specialization in obstetrics or gynæcology, or both, to those who comply with its requirements, and is now prepared to receive applications from experienced and qualified obstetricians and gynæcologists.

This Board has been in the process of organization since 1927. It is hoped and expected that its certificate will have considerable weight in the minds of hospital trustees and other laymen as well as in many important medical circles whenever a question arises as to an individual's special ability in obstetrics and gynæcology.

Detailed information and application blanks may be secured from Dr. Paul Titus, Secretary, 1015 Highland Building, Pittsburgh, Penn.

A New Method of Research in Heart Disease

The Robinette Foundation of the University of Pennsylvania has introduced a new method of research in cardiac affections. In this the contractions of the heart are studied by synchronizing the electrocardiograph with x-ray photography. In this way it is possible to time accurately any point on the curve of movement within one-hundredth of a second of the corresponding event on the electrical curve of action. It has been found that certain types of heart disease cause characteristic alterations from the normal in the curve of contact. In applying this technique to the study of the aorta it has been possible to obtain photographic records of human pulse waves and thus study the early stages of arteriosclerosis.

A New Journal of Clinical Pathology

It is announced that, beginning in January, 1931, the American Society of Clinical Pathologists will publish a bimonthly journal, to be known as *The American Journal of Clinical Pathology*. This journal will receive original papers dealing with clinical pathology and closely allied subjects, and also articles dealing with new methods and the appraisal of old methods in the application of pathology to medicine and surgery. The editor is Dr. Thomas B. Magath, the Mayo Clinic, Rochester, Minn.

Prof. R. Tait McKenzie

It is announced that Dr. R. Tait McKenzie, Professor of Physical Education in the University of Pennsylvania, is to retire when a survey of student health is completed. Dr. McKenzie, will, however, retain in some way an affiliation with the university, his exact position being announced later. He will devote most of his attention to sculpture, in which art he is so widely and appreciatively known. Dr. McKenzie is a graduate of McGill University and at one time was a member of its teaching staff, in the Department of Anatomy. Among many highly artistic works to his credit may be noted the War Memorial in the Parliament Building at Ottawa, the Scottish-American War Memorial at Edinburgh, the statue of Wolfe at Greenwich, and the statue of Franklin at the University of Pennsylvania.

Dr. Chevalier Jackson

Dr. Chevalier Jackson resigned lately from the Faculty of the Graduate School of Medicine of the University of Pennsylvania, and has been appointed Emeritus Professor of Bronchoscopy and Œsophagoscopy and Consultant to the Graduate School. He intends to devote most of his time to the development of a bronchoscopic clinic at the Samaritan Hospital and to his professorship at the Temple University School of Medicine. He will, however, continue his special courses of instruction at the Graduate School of Medicine. During the month of October Dr. Jackson lectured with great acceptance on his specialty before the Fellows of the Royal Society of Medicine, London.

The William H. Welch Medical Library

Dr. Fielding H. Garrison, Librarian of the William H. Welch Medical Library, has been appointed Resident Lecturer in the History of Medicine in the Johns Hopkins University.

GENERAL

Prof. A. B. Macallum

The members of the staff and the students of both McGill University and the University of Toronto, as well as the numerous graduates of both universities, will be pleased to note that their former Professor of Biochemistry, Dr. A. B. Macallum, now retired from active duties, has received additional honours during the past year. He was chosen to be the recipient for this year of the Flavelle Medal of the Royal Society of Canada; and in association with Professor Lapricque of Paris he has been elected, out of forty other names proposed, as Foreign Member of the American Academy of Arts and Sciences, an old society founded in the eighteenth century. It was only recently also that the American Philosophical Society of Philadelphia, founded in the earlier decades of the eighteenth century, honoured him by making him an honorary fellow. There are few Canadians who have had so many honours showered upon them. Osler in 1903 referred to Macallum in his address "The Master Word in Medicine" as having won a world-wide reputation by his intricate studies and carried the name of his university to every nook and corner of the globe. Canada can to-day be proud that there are others working on similar lines and of whom the same can be said.

TO RENT—Stand of sixty years, having four rooms (waiting, consulting, electrical therapy and dispensary); will sell drugs and equipment. (b) Would consider taking partner. Town of about 3,000; large country district; half-hour to hospitals, 18 miles from Windsor. Apply Box 140, C.M.A.J., 3640 University St., Montreal.

WANTED—General Practitioner for rural district, Alberta. General practise, fees limited, salary $2,000.00. For particulars apply, stating qualifications, to P. R. Hooper, Sec.-Treas., Dunstable, Alberta.

RECENT graduate, Manitoba, with four years general practice, desires affiliation with older man, preferably in city and doing major surgery. Not afraid of work. Apply Box 141, C.M.A.J., 3640 University St., Montreal.

International Congress of the History of Medicine

The eighth International Congress of the History of Medicine was held in Rome from September 22nd to 28th, under the presidency of Dr. Pietro Capparoni, Professor of the History of Medicine at Paris. There was an attendance of about 250 members from fourteen different countries.

The meetings were held in the Accademia dei Lincei, where three principal subjects were discussed. The first was the protection of Europe against leprosy in the Middle Ages, which was opened by Professor Jeanselme of Paris, followed by Drs. Veronica Gomoiu, Tricot-Royer, Carvalho, Torkomian, Pazzini, and Hult, who dealt with the incidence of leprosy in Rumania, Belgium, Portugal, Armenia, Rome, and Sweden respectively. The second theme was the medical and scientific relations between Italy and other European countries during the Renaissance, which was introduced by Professor Castiglioni, professor of the history of Medicine at Padua, and continued by Professor Sudhoff of Leipzig, Dr. Unger of Amersfoort, Dr. Gomoiu of Bucarest, and Dr. Carvalho of Lisbon. The third subject, which was the question of making the study of the history of medicine compulsory in medical faculties, was introduced by Dr. Ladislav Szumoswski of Cracow, in which Professor Koch of Frankfort, Professor Diepgen of Berlin, and Dr. Laignel-Lavastine of Paris took part. The congress came to the conclusion that this subject should be made compulsory, and that a notice of this decision should be sent to the various Governments represented at the congress.

Among the large number of other papers on various subjects may be mentioned those on the relations between the Accademia di Cimento and the Royal Society, by Dr. Mosè de Segni; Nicolas Steno, by Dr. V. Meisen; the appearance of chlorosis in the sixteenth century, by Dr. Axel Hansen; malaria in contemporary poetry from Virgil to Carducci, by Signora Anna Celli; and Girolamo Cardano and Leonardo da Vinci, by Professor Bilancioni. The only British contributions were those on madder in the history of medicine, by G. R. Cameron, and a rare Jewish medical caricature of the eighteenth century, by Dr. D. A. H. Moses.

The receptions included an audience and address by the Pope, visits to the Bibliotheca Casanatense and Bibliotheca Lancisiana, and excursions to Lake Nemi and Monte Cassino, where a bronze was presented to the monastery in recognition of its services to medical science during the Middle Ages. No effort was spared by the authorities to make the foreign doctors and their families feel at home in the Eternal City, and until the last evening when Jupiter Pluvius became active, the weather remained ideal.

During the congress Professor Giordano of Venice was elected president of the International Society of the History of Medicine, in succession to Dr. Tricot-Royer of Antwerp, who has held office since the foundation of the society in 1921. The nert congress will be held in Bucarest in 1932.—*Brit. M. J.* **2:** 609, 1930.

The Pan-Pacific Surgical Association

The next Pan-Pacific Surgical Congress is to be held in Honolulu in April or May of 1932. Canadian surgeons, particularly those of the western section of our country are invited to contribute papers. It is reported that the conference held in Honolulu last year was most successful.

All information can be obtained from the Secretary-treasurer, Dr. F. J. Pinkerton, 45 Young Building, Honolulu, T.H.

Information Bureau for the Foreign Doctor

It is probable that few foreign doctors visiting Paris realize that a bureau is provided specially for them. It is known as the Bureau des Relations Médicales avec l'Etranger, and it is to be found in the Salle Béclard, at the Faculté de Médecine . It is open from 9 to 11 in the morning and from 2 to 5 in the afternoon. Saturday afternoons excepted—a concession, no doubt, to the *semaine anglaise*, the recreational facilities of which are being more and more appreciated in France. The information provided by the polyglot staff of this bureau is, of course, adapted to the needs of the individual inquirer, but there is also a brochure of considerable general interest. It gives particulars of post-graduate courses—*cours complémentaires et de perfectionnement*—some of which are specially provided for the foreigner. At the Hôtel-Dieu, for example, four post-graduate courses have recently been organized for foreign visitors and have been attended by representatives of 20 different nations. Demonstration visits to places like Vichy are also organized. At the obstetrical Clinique Tarnier there is even a course free of charge, but as a rule a modest fee is charged for attendance at each course.

An International Medical Tour

An international medical tour will be conducted from December 26th to January 8th, visiting Marseilles, Toulon, Hyères, Saint-Raphael, Cannes, Nice, Bordighera, Monaco, and other places of interest. Full information as to the cost of this tour and the various festivities in connection with it may be obtained from the secretary at the Federation of the Health Resorts of France, Tavistock House (North), Tavistock Square, London, W.C.1.

The Third International Congress of Radiology

The third International Congress of Radiology will be held in Paris at the end of July, 1931, the sections being roentgen-diagnosis, roentgen- and curie-therapy, radio-biology, radio-physics, natural and artificial heliotherapy, and medical electrology.

The Congress of the Royal Institute of Public Health, Frankfurt-am-Main, 1931

On the invitation of the German Government, the Municipality and University of Frankfurt, the Royal Institute of Public Health of London will hold its next Congress in Frankfurt from May 19th to 24th.

Arrangements have been made to visit the chief places of interest in Frankfurt and also the baths of Nauheim, Homburg, Wiesbaden, with a special trip to Heidelberg, on the invitation of the Oberburgermeister.

The total cost varies from £11 19s. 6d. to £20 7s. 6d. according to accommodation. A visit will also be arranged to Bad Munster-am-Stein and Bad Kreuznach at an extra charge.

All information relating to this trip can be obtained from the Secretary, Royal Institute of Public Health, 37 Russell Square, London, W.C.1.

A Necropsy Without Permission

The head of a medical university clinic in Germany was recently prosecuted because he performed a post-mortem examination in face of the relatives' express request that he should not do so. The prosecution was for damage to property. The local court gave a verdict of not guilty because the defendant gave evidence that he did not know that the relatives had protested against a necropsy. On appeal of the public prosecutor the High Court confirmed the verdict. The court stated in their judgment that a prosecution for damage to property was impossible because a corpse was not a thing which could be damaged. This would be in contradiction with the feelings of the people. A corpse destined for burial was nobody's property, and the defendant would not have been guilty even if he had known that the relatives objected.

Prof. Karl Landsteiner, of New York, has been awarded the Nobel prize in medicine for 1930.

Prof. Landsteiner was given the award in recognition of his discovery of human blood groups. He is a member of the Rockefeller Institute in New York, and has gained international fame for his medical research. His record includes ten years in the University of Vienna, Austria, as pathologist. In 1922 he joined the Rockefeller Institute for Medical Research.

Prof. Landsteiner has contributed important papers on immunology, bacteriology and pathology. He was born in Vienna, Austria, in 1868.

Aside from the award in medicine there are three other prizes, namely in literature, chemistry and physics Each of these prizes, as well as the fifth, the so-called Peace Prize, this year will be worth 173,000 kroner (about $47,000). The Peace Prize is awarded by the Norwegian Parliament.

A New Issue of Spanish Stamps Commemorative of Columbus

Medical philatelists will, we think, be interested in a new issue of stamps by Spain, commemorative of Columbus' immortal voyage of discovery to the New World. A complete set of these has been sent to the *Journal* through the courtesy of Senor Don Eduardo Navarro, of Madrid.

Every year, in Spain, the discovery of America is recalled by appropriate ceremonies, usually in October, and this time the event was further emphasized by the issue of these special stamps, which made their appearance at the time of the Seville Exhibition and are now in general circulation.

The series consists of twelve stamps; five for ordinary postage; four for European air-post; and three for American air-post. The stamps are large; some of them, indeed, are almost suitable for framing! They are striking and artistic in designs, and, we note, have been produced in London.

Of the ordinary postage issue the 2 and 10 centimos show bow and stern views of Columbus' ship, the *Sancta Maria;* the 30 centimos, the departure of Columbus from Palos on August 2, 1492; the 40 centimos, Columbus' flotilla; and the 4 pesetas, the disembarkation of Columbus on the soil of the New World on October 12th, of the same year.

Of the aerial post issue for Europe, the 10 centimos presents a picture of the monastery of La Rabida, to which Columbus retired; the 40 and 50 centimos, the portraits of the brothers Pinson, the two captains of Columbus; and the 4 pesetas, Columbus' disquietude on his journey.

Of the aerial post issue, for use to America, the 10 centimos shows the monastery of La Rabida; the 50 centimos, the portrait of the great navigator himself; and the 4 pesetas, the portraits of Columbus and the two Pinzons.

These stamps form a pleasing addition to the already large series of decorative commemorative stamps. Good representations of them appeared during October in the London Illustrated News.

Book Reviews

Report on Fifth International Congress of Military Medicine, Surgery and Pharmacy, London, May, 1929. Commander William Seaman Bainbridge, M.C.F., United States Naval Reserve. 154 pages, illustrated. The Collegiate Press, George Banta Publishing Co.

Commander Bainbridge, delegate from the United States, and a member of the permanent Committee, presents in this volume his report of the proceedings of the Congress. A concise report of the proceedings appeared in *The British Medical Journal* of May 18th last, and the official volume of the proceedings has already appeared. In this report the discussions of the Congress have been well summarized. The principal subjects were; the evacuation of sick and wounded by air and water, tropical fevers of short duration, injuries to blood vessels and their sequelæ, the physical and clinical analysis of glass and rubber articles employed in the services, and the standard of dental and physical fitness in the various military services. Four pages detail the conclusions of the Congress. The papers and discussion on blood-vessel surgery should be of great interest to the civilian surgeon, while civilian pharmacists and laboratory workers should welcome the discussion on analysis of glass and rubber used so much by them.

The Congress, first meeting in Belgium in 1921 with twenty nations represented, had forty nations participating at the London meeting. At the next Congress, to be held in Buda-Pest, Germany will be sending delegates for the first time. The report includes reference to the hospitality extended the delegates in Britain and pays tribute to those who organized the Congress and its entertainments. From the comprehensive report before us it is quite evident that the Congress is steadily increasing in value and importance. Captain J. W. Williams, M.C., R.C.A.M.C., appears as Canada's official delegate among the 108 representatives of the forty countries. About 750 members were present.

The Clinical Interpretation of Aids to Diagnosis. By various authors. Vol 1. 380 pages. Price, 10/6 net. Published by The Lancet Ltd., London, 1930.

This book has as its aim the interpretation of laboratory aids to diagnosis. It is from the pens of thirty authors who fall into two groups; specialists likely to appreciate the needs of the general practitioner, and men who have themselves helped to establish the significance of many of the tests. The subjects treated cover practically every field of medicine into which the laboratory has ventured. No attempt at detailed description of the technique of any of the tests has been made. The authors have stated the purpose of the various laboratory procedures, and in a few cases indicated briefly how the tests are carried out, but the purpose in each instance is clearly to convey to the reader in as few words as possible what information may be expected from the laboratory report. It would be impossible in a brief review to enumerate even the subjects discussed, and invidious to single out any one author as worthy of special reference. From beginning to end the book is concise, to the point, and surprisingly well condensed. It is worthy of a place in every medical library.

Intestinal Tuberculosis, its Importance, Diagnosis and Treatment. Lawrason Brown, M.D., Consultant to the Trudeau Sanatorium, Saranac Lake, and Homer L. Sampson, Roentgenographer of the Trudeau Sanatorium, Saranac Lake. Second edition. 376 pages, illustrated with 122 engravings and 2 coloured plates. Price $4.75. Lea & Febiger, Philadelphia, 1930.

The first edition of this work was fully reviewed in this *Journal* in May, 1926, when we pointed out the great advance made in the diagnosis of intestinal tuberculosis by the work of the authors of this monograph. Intestinal tuberculosis, a serious and frequent

complication of advanced pulmonary tuberculosis, is often present without definite symptoms. Only in far advanced and practically hopeless cases could the diagnosis be made with reasonable certainty by ordinary clinical study. Brown and Sampson have placed the diagnosis on an almost absolute basis. Their series of cases, 361 in the first edition, has increased to 1,465, and their conclusions are practically the same as four years ago. The roentgen method is now in general use, and their conclusions have been confirmed by all clinicians and radiologists who have followed the method.

The new edition describes the methods of examination in greater detail, and the essentials of diagnosis are summarized in a few pages. Additional tables, diagrams and illustrations have been added. The bibliography has been extended. The monograph is a most attractive and valuable one. The authors are to be congratulated upon their presentation of the additional facts and upon their clear demonstration that intestinal tuberculosis can be surely and accurately diagnosed.

A Brief History of Medicine in Massachusetts. Henry R. Viets, M.D., Fellow of the Massachusetts Medical Society. 194 pages, illustrated. Price $4.00. Boston and New York: Houghton Mifflin Co., 1930.

This book forms a contribution, through the Massachusetts Medical Society, to the Tercentenary Celebration of the settling of the Massachusetts Bay Colony, and appears on the eve of the 150th anniversary of the founding of the Massachusetts Medical Society. We are told that the development of medicine in Massachusetts in the seventeenth century was a curious mixture of independent thought and the propagation of established tradition. No physician of eminence came early to the colony and medicine was transfered by ministers partly trained as physicians, and the lowest class of medical man, the barber-surgeon. The early chapters deal with the colonial period and the 18th century to the American revolution. The earlier doctors were mostly preacher physicians, but gradually medicine was divorced from the influence of the church. The author gives in short space a splendid picture of the work of the early men, principally through personal reference rather than description of the general methods of practice. In the latter part of the 18th century he traces the development of the Massachusetts Medical Society and the Harvard Medical School. Following this period vaccination comes into prominence, the organization of the Massachusetts General Hospital and the foundation of the *Boston Medical and Surgical Journal*. The story of Oliver Wendell Holmes and puerperal fever is well told, as is the history of ether anæsthesia which must ever be a source of pride to Boston and New England. The last chapter on modern developments in medicine and surgery brings this concise history down to the present day.

The Psychology of Insanity. Bernard Hart, M.D., F.R.C.P., Fellow of University College, London, etc. 4th edition, 176 pages. Price $0.90. Cambridge University Press. London; Macmillan Co. of Canada, Toronto, 1930.

It is a great pleasure to welcome the 4th edition of this famous little book. First published in 1912 and reprinted ten times in the 3rd edition is a record that speaks for itself. The introduction to this edition extends to twenty pages and takes the form of "a general sketch of the history and present position of psychopathology." This is a concise statement, easy to read and understand, that is a very worthwhile addition to an excellent book.

The author has stated in previous editions that he is presenting only a sketch of the various schools of psychopathology, and that he has selected only those sections from the field of mental disorder in which psychological methods have proved fruitful. In the new introduction the author continues to pay tribute to the dominating influence of Freud's work in the development of psychopathology, although he does not accept many Freudian conceptions. As he states, he does not pretend to describe Freudian theories, but considers selected parts of Freud's teaching and attempts to bring these into line with the work of other investigators.

The book is already well known throughout the English-speaking medical world and, in the present edition, will continue more surely to provide the best available general introduction to psychopathology. There must be few students or medical men who would not agree that this was one of the most interesting books they had read.

Manual of Midwifery. Henry Jellett, B.A., M.D., F.R.C.P.I., L.M., Late King's Professor of Midwifery in School of Physic, Trinity College, Dublin, and David G. Madill, B.A., M.B., B.A.O., L.M., Gynæcologist to Adelaide Hospital, Dublin, etc. Fourth edition. 1281 pages, illustrated. Price $7.50. Macmillan Co. of Canada, Toronto, 1929.

The 1929 edition of this well-known obstetrical work has been thoroughly revised, and the recent developments in the subject have been added. It is written for students and practitioners, and will serve as a valuable book of reference for all methods employed in midwifery. Throughout, the teaching and practice of the Rotunda Hospital have been adhered to.

New chapters on Anæsthesia, Nephritic and Pre-eclamptic Toxæmia, and Pyelitis in Pregnancy have been added. The chapter on Bacteriology of the Genital Tract has been completely revised by Prof. Bigger as also the ones on the Anatomy of the Pelvis, and on the Functional Organic and Infectious Diseases of Pregnancy.

The fourth edition of this work since 1905, written by two such well-known obstetricians stamps the work as a valuable addition to any medical book shelf.

A Compilation of Culture Media for the Cultivation of Microörganisms. Max Levine and H. W. Schoenlein of the Department of Bacteriology, Iowa State College. Seven thousand formulæ classified in seven major groups indexed by name, constituents, use and authors. Price $15.00. Williams & Wilkins Co., Baltimore, U.S.A., 1930.

As the title indicates, this volume is a compilation of formulæ for the manufacture of media recommended and used for the growth of bacteria and other microorganisms. The work was undertaken at the suggestion of the Society of American Bacteriologists, for the purpose of bringing together for ready reference, and to avoid duplication in literature, the many culture media formulæ that have been published and are scattered throughout journals and other publications and hence are not readily accessible.

Formulæ of seven thousand media were gleaned from the literature and are arranged and classified into approximately twenty-five hundred quite distinct media. Each medium is given a number and a descriptive name, where possible indicating its author and the chief constituents contributing carbon or nitrogen source. The media are classified primarily under seven groups, the first of which is "Liquid Media" and the others the various types of solid media, grouped according to the agent causing solidification. All groups are further subdivided in an effort to bring together those media closely related.

This volume should prove of great value to bacteriologists, permitting a rapid review of culture media; without entailing the time- and labour-consuming task of a search through the literature. References to the litera-

ture from which the formulæ are obtained are freely given. The authors are to be commended on their successful completion of so tedious an undertaking.

Treatment of Epilepsy. Fritz B. Talbot, M.D., Clinical Professor of Pædiatrics, Harvard University Medical School, etc. 308 pages. Price $4.50. Macmillan Co., New York, 1930.

That there is taking place a great increase in medical interest in the subject of epilepsy is amply attested by the growing number of papers relating to it. The appearance in the past few years of several monographs on the subject further testifies that not only is interest increasing but that significant progress is being made in this age-long problem. And it is well that attention should again be so directed since there seems little doubt that epilepsy or the epilepsies are increasing. One of the signs of growing enlightenment is the return to the Hippocratic opinion that epilepsy should not be considered a disease entity but rather a symptom complex the causes of which are extraordinarily diverse and the mechanisms of which are extremely intricate.

Perusal of the volume under review impresses one with the truth of these statements. The author, whose experience appears to have been largely with child patients, devotes his introductory chapter to a short, concise statement of the varying views of epilepsy and to the incidence. Whilst the book's primary purpose is the discussion of treatment, readers will be very glad to have condensed in one volume the surveys of views on etiology, symptomatology, diagnosis and prognosis. Under etiology, statements of varying amount of detail are made on eighteen subjects. The consideration given to these various possible causative factors seem to be on the whole fair. One notes, however, some omissions and some statements that would scarcely be acceptable to many. That tumours other than cysts play a very slight rôle in the etiology of epilepsy, that there is nothing to support a relationship between epilepsy and menstruation, and that epilepsy is sometimes secondary to dementia præcox are statements that will not find favour. The discussion on pathology is necessarily brief but the tendency rightly is to consider that disordered function rather than anatomical lesion is primarily responsible. The section on diagnosis might be improved by some mention of the puzzling varieties of epilepsy since it is these, rather than the more dramatic episodes, that cause confusion. Some of these atypical forms are noted later in the chapter on symptoms. That some subjects are not mentioned where one would expect them, but appear elsewhere, might be mentioned as one point of criticism. One must not forget, of course, that the book does not purport to be a treatise on all aspects of epilepsy. Its specific purpose is to deal with treatment and at this task the author acquits himself well. His discussion of general principles, surgery and the mental hygiene and educational aspects of treatment is particularly good. Outspoken evidence of the author's great enthusiasm for dietetic treatment is plain when it is found that of 188 pages devoted to treatment, 136 deal with treatment by diet and dieting. No one doubts the value of these therapeutic resources but it scarcely seems likely that they deserve this proportion of attention. No one approach in treatment will be found equally valuable in the multiple types of variable origins of such a disorder as epilepsy. Practical experience certainly attests the value of dietetic treatment in the treatment of a proportion of the cases of epilepsy in children. It is equally certain that such treatment is not so efficacious in a very fair proportion of cases among children and a greatly increased proportion of adult cases. However, everyone treating epilepsy should know the rationale and methods of dietetic treatment and in this book he will find a detailed discussion with inclusion of many valuable tables of food values, typical meals, etc. The relationship of fluid intake to epilepsy, brought to the attention of the profession by Temple Fay, is well discussed. One suspects that treatment based on dehydration will not prove fruitful. In fact, accounts of adverse or no results are beginning to appear in the current literature.

Those who have not grasped the astounding intricacies of epilepsy as a subject of clinical investigation and study will have their eyes opened by the specimen forms suggested for use in a survey of epilepsy. An excellent bibliography covering nearly thirty pages and listing 306 items, concludes the book.

A Practical Medical Dictionary. Thomas Lathrop Stedman, A.M., M.D. 1234 pp., XXII plates. Eleventh edition. Price, $7.50. William Wood and Company, New York, 1930.

The editor of a medical magazine is always interested in a medical dictionary, and the contributors ought to be. The eleventh edition of Stedman's Practical Medical Dictionary is a welcome friend, and it is, we are informed, the only standard medical dictionary to receive revision this year. It is thoroughly up to date, and, indeed, in admitting new words introduced by the comparatively new science of radiology, it is beyond date. Some new plates have been added and almost every page shows some change.

Started in 1908 in the hope of purifying medical orthography, Stedman's Dictionary has maintained a consistent struggle against certain deplorable tendencies in orthography that were manifesting themselves in the United States. It had a herculean task, and we can quite enter into the satisfaction of the erudite editor when he records in the preface to the present edition that his object has been nearly obtained. There is yet some distance to travel, we think.

To reach the objective that Dr. Stedman and others who think with him have in view requires somewhat wide learning in philology, a love for the historical genealogy of words, patience, and courage. It would be almost an endless task to enter into the principles that should guide orthographical practice, and we realize that a time comes in the development of a language when custom condones many solecisms and inaccuracies. It is, however, a matter of opinion as to when custom should rule. We hasten to say that we are in general accord with the principles that Dr. Stedman has adopted. Yet, without intending to be hypercritical, we do not quite agree with him in his remarks anent the transliteration of the Greek kappa into the English "c", even before a soft vowel. This in many cases invites false pronunciation. We do not like the spelling "leucemia," for example, even if there is authority for it. But, of course, Dr. Stedman can retort with the word "cinema." We are sorry to see the word "technic" admitted as an equivalent of "technique." "Technic" is a useful adjective, but an unnecessary noun. "Appendectomy" is incorrect in form, besides being a hybrid, but it is now of little use to protest. We are also sorry to see the word "bacteremia" given dictionary cachet. "Bacteriemia," (bacteriæmia) or "bactremia" (bactræmia) can prove their descent, but "bacteremia" should receive no quarter.

This gentle criticism, however, does not detract from the fact that Stedman's Practical Medical Dictionary is an excellently good book. It is healthily conservative, very complete, helpful in many ways, and should be in the library of every medical man. Note should be made of the fact that there are some useful appendices, dealing with such topics as Drugs and their Dosages, Weights and Measures, Chemical Elements, Comparative Temperature Scales, and Pathogenic Microparasites. We have little but commendation for the work, and hope it will long continue to be powerful in the good cause.